

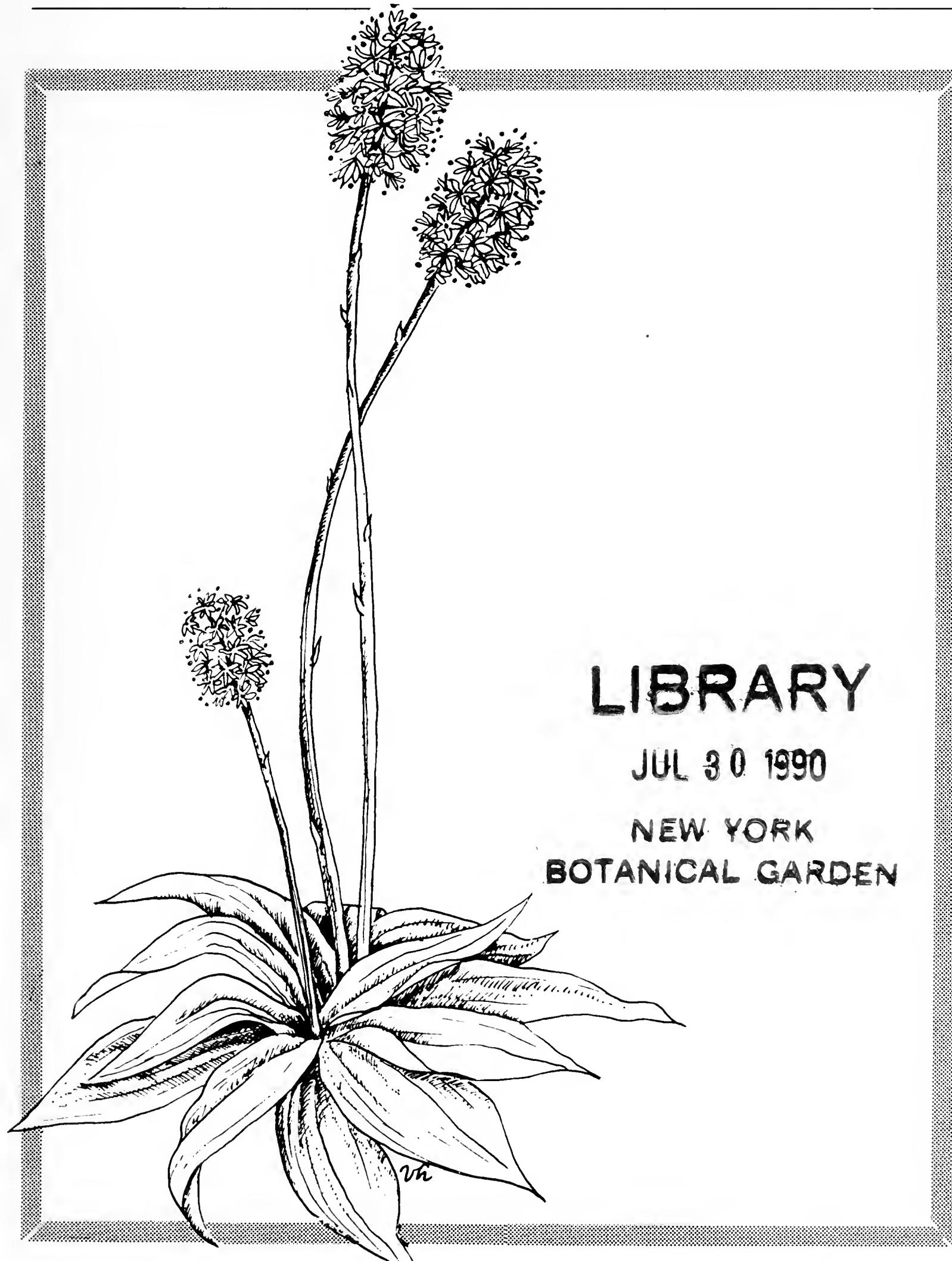
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Tipularia

A BOTANICAL MAGAZINE

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Byliners

Artists

Vicki Holifield, an art and French major at Hendrix College, Arkansas, and student of watercolor with Larry King, is presently working in the Interlibrary Loan Department of Pitts Library, Emory University.

Marilynn Mallory, B.A. Tulane University, with an M.A. in Education, is now on the office staff of Agnes Scott College. She has taught art at Broward Community College in Florida, at DeKalb College, Oglethorpe University and Georgia State University, Atlanta. As part of the North Art Center Gallery's "Earth, Water, Fire" show in Atlanta June 28 - July 26, samples of her art work will be on display.

Larry Zettler is completing his master's degree in botany at Clemson University. His thesis was on *Platanthera integrilabia* (Old Monkeyface).

Authors

George M. Goldman, who has a B.A. from Emory University, is a founding member of the Incredible Edibles and long-time member of the Georgia Botanical Society. His interests in botany were initiated in the Boy Scouts and enhanced by years of Marie Mellinger's classes. An active member of the Greater Atlanta Rose Society, he is attempting to grow roses organically. He is also an avid back packer and camper.

R. Michael Green is a member of the Georgia Botanical Society who serves as a volunteer at the Chattahoochee Nature Center. He is the Deputy Public Health Commissioner for Administration with Fulton County, Georgia. A Georgia Master Gardener, Michael is active in several community organizations.

Thomas S. Patrick, botanist with the Georgia Department of Natural Resources, does most of the leg work concerning the State's efforts to protect rare plants. Begun in 1986, the Freshwater Wetlands and Heritage Inventory Program maintains records, conducts searches and provides in-

formation on Georgia's rare species and natural areas. His own favorite plants are the trilliums!

George Sanko taught biology and botany at DeKalb College for 25 years. He retired January 1, 1990, and is presently working on the DeKalb College nature trail and Herbarium.

Sarah Anne Staples, professor of biology at Andrew College in Cuthbert, Georgia, has presented numerous programs for clubs and organizations in Southwest Georgia on native plants and wildflowers. An example of her interest in plants in literature is the preparation of a program on Eudora Welty's use of plants in her short stories.

Jonathan P. Streich is Director of Protection Planning and Stewardship for The Nature Conservancy in Georgia. He attended Juniata College in Huntingdon, Pennsylvania, receiving his M.A. at Penn State in environmental education. He has worked with the U.S. Fish & Wildlife Service and the U.S. Army Corps of Engineers. Brought up in Ecuador by his missionary parents, Jonathan has recently been in South America again, but this time revelling in an exotic trip on the Amazon River.

Miriam Talmadge was born and grew up in Europe, later she lived in New York City and Athens, Georgia, and now spends most of her time in the North Georgia mountains. She writes occasional columns and articles for several newspapers and magazines. She has been Newsletter Editor for the Georgia Botanical Society for six years.

Harriett L. Whipple, B.S. Furman University, M.S. Clemson University, Ph.D. University of North Carolina, is a professor at Georgia College, Milledgeville. In addition to serving on the Board of *Tipularia*, she is faculty advisor for Alpha Delta Pi, works with students doing independent research and is extensively involved in community service.

Robert Zahner, a North Carolinian brought up in the Southern Appalachian Mountains, received his Ph.D. in forest botany at Duke University. He has served with the U.S. Forest Service as a research ecologist, at the University of Michigan as professor of forest botany, and as professor of silviculture at Clemson University.

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Front Cover *Helonias bullata*, swamp pink, the newly protected, gorgeous member of the Lily Family. *Illustration by Vicki Holifield*

Back Cover A typical young second-growth forest, which, if left alone, has the potential of developing into a mature, old-growth forest in another 150 years. (Courtesy Marilynn Mallory and the Georgia Appalachian Trail Club)

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Restoring Forest Diversity In The Southern Appalachian Mountains

By Robert Zahner

Photographs supplied by Robert Zahner

“A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.”

—Aldo Leopold, 1949

Introduction

WE STAND at the threshold of redefining the importance of our mountain landscape, its natural habitats and the biota they support. Science has shown that such habitats are vital to planetary life support systems where natural communities of interdependent flora and fauna can maintain reservoirs of biological diversity.

When European man destroyed the primeval forests of the Southern Appalachian Mountains, a major component of natural diversity—habitat continuity over large areas—was lost forever. For a century between 1830 and 1930 forest clearing and burning ravaged native biotic communities. Habitats were fragmented, and surviving endemic species of the mature forest were left in isolated communities. Small reservoirs of this genetic material were preserved, unique combinations of forest interior flora and fauna.

In the first quarter of this century, with the establishment of the Southern Appalachian National Forests as watershed preserves, federal conservation policies permitted many forest habitats to begin the natural process of restoring themselves. Gradually small fragments of biota spread into larger

communities. Some merged or formed ecotones (edges) with other habitats, so that a continuous forest cover developed over many tens of thousands of acres. This second generation forest was similar to the original primeval forest only in that it still contained most of the original plant and animal species. Today, after 60 to 80 years of recovery, the new forest is still maturing, still unfolding its species composition as new niches are created in the complex progression toward what modern ecologists term an “old growth forest.” But it still has a long way to go to biological maturity. We are perhaps halfway there.

There is now the potential to restore a diversity of biota that resembles the primeval forest. There is also the danger, in present National Forest management plans, of losing much of the restoration already gained. The United States Forest Service, administered by foresters who are highly competent *timber* managers, narrowly interprets the Congressional Multiple Use-Sustained Yield Act of 1960 with a strong bias toward harvesting commercially mature timber. The Act states implicitly, however, that *all* resources of the



An old growth white oak forest. Some of these gnarled trees are over 400 years old. Unsuitable for timber, such old forests are not at risk and are counted as de facto old growth.

National Forest shall be managed for sustained yield. Other acts of Congress go on to define natural diversity as a vital resource of the public lands. They also mandate that this resource shall be maintained through habitat preservation. This paper is written with the intent of furthering public knowledge of this important environmental issue.

Three Levels of Diversity

In the despoilment and fragmentation of the original forest, three levels of diversity were either destroyed or placed in jeopardy: (1) genetic diversity within species, (2) species diversity within habitats, and (3) habitat diversity within landscapes. We have no record of how many species were irretrievably lost, but we are beginning to count the numbers that today are still endangered and threatened with extinction. Let us consider how these three types of diversity are essential for a healthy bioregion, and how all three can be restored as the new forest grows toward biological maturity.

Genetic Diversity

A great many species counted as rare today can again become more

abundant simply by allowing natural biotic processes to evolve unmolested. An example will help clarify this phenomenon. The mountain gentian (*Gentiana decora*) in the Southern Appalachians grows today singly or in small colonies in damp, rich wooded habitats, generally isolated from other members of the species by unsuitable habitats. Gentians are pollinated by a number of insects whose ranges are limited by terrain and plant cover. These pollinators are each able to reach several widely separated colonies of the plant. Thus, if left undisturbed by man's activities, genetic diversity will continue to increase through pollen exchanges from habitat to habitat over an ever increasing area of the mountain landscape. Such phenotypic diversity is critical to the future well being, even survival of this species, as man-caused environmental changes continue to force all biota to adapt to such stresses as atmospheric pollution and accelerated climate warming.

Similar scenarios can be made for literally thousands of species of plants and animals throughout the mountains. The endemic terrestrial mole salamander (*Plethodon jordani*) is a

highly significant insectivore in the food chain of soil fauna occurring in the leaf litter under mature hardwood forest. Breeding populations of this animal disappear following removal of the forest and recover only with the regrowth of the mature hardwood forest. Viable genetic exchange cannot occur within fragments of mature habitat for this salamander, which requires contiguous forest cover for migration among populations. Forest dwelling web-building spiders do not migrate across extensive man-made disturbances, limiting their genetic diversity to small populations until such time as their mature forest habitat again becomes extensive.

Forest fragmentation, therefore, leads to inbreeding and extinction for those species of the forest interior with limited mobility for migration. Genetic diversity is essential to provide sufficient adaptability within each species to give that species the capacity to adjust and evolve to survive the accelerating environmental changes expected in the next century.

Species Diversity

The next level of diversity—species within habitats—is often misinterpreted by federal land managers to mean simply the greatest number of different species on a given unit area of land. Forest Service policy makers conclude that timber and game management activities meet the legal requirement for biodiversity. It is well known that the natural succession of weedy species occupying disturbed sites provides a wealth of diversity in terms of total numbers. The Southern Appalachian Mountains today abound with disturbed sites, the result of land clearings, road building, commercial and residential development, forest clearcutting, agricultural practices, and wildfires. Therefore, the most common diversity is that of seral (successional) plant and animal communities, weedy annuals, biennials and perennials, with their attendant in-

vertebrate and other animal species. Young regrowth forests abound.

But what about species diversity in habitats that were once common in the primeval forest? The one condition that managed forests do not meet is that of providing for the species diversity in critically short supply: that associated with mature old growth forests. From the biological standpoint, a typical old growth forest in the Southern Appalachians supported a mature overstory of 20 or more species, trees in all stages of aging, including senescence, as well as dying, standing dead, and fallen dead trees. Bole cavities were common, formed by heart-rotting fungi, providing shelter and parturition sites for many birds and mammals. The midstory was composed also of perhaps 20 or more species of smaller trees of all ages, from reproduction saplings filling canopy gaps to very old species adapted to live out their lives under the canopy. Many tree species were more common in the ancient forest than in today's.

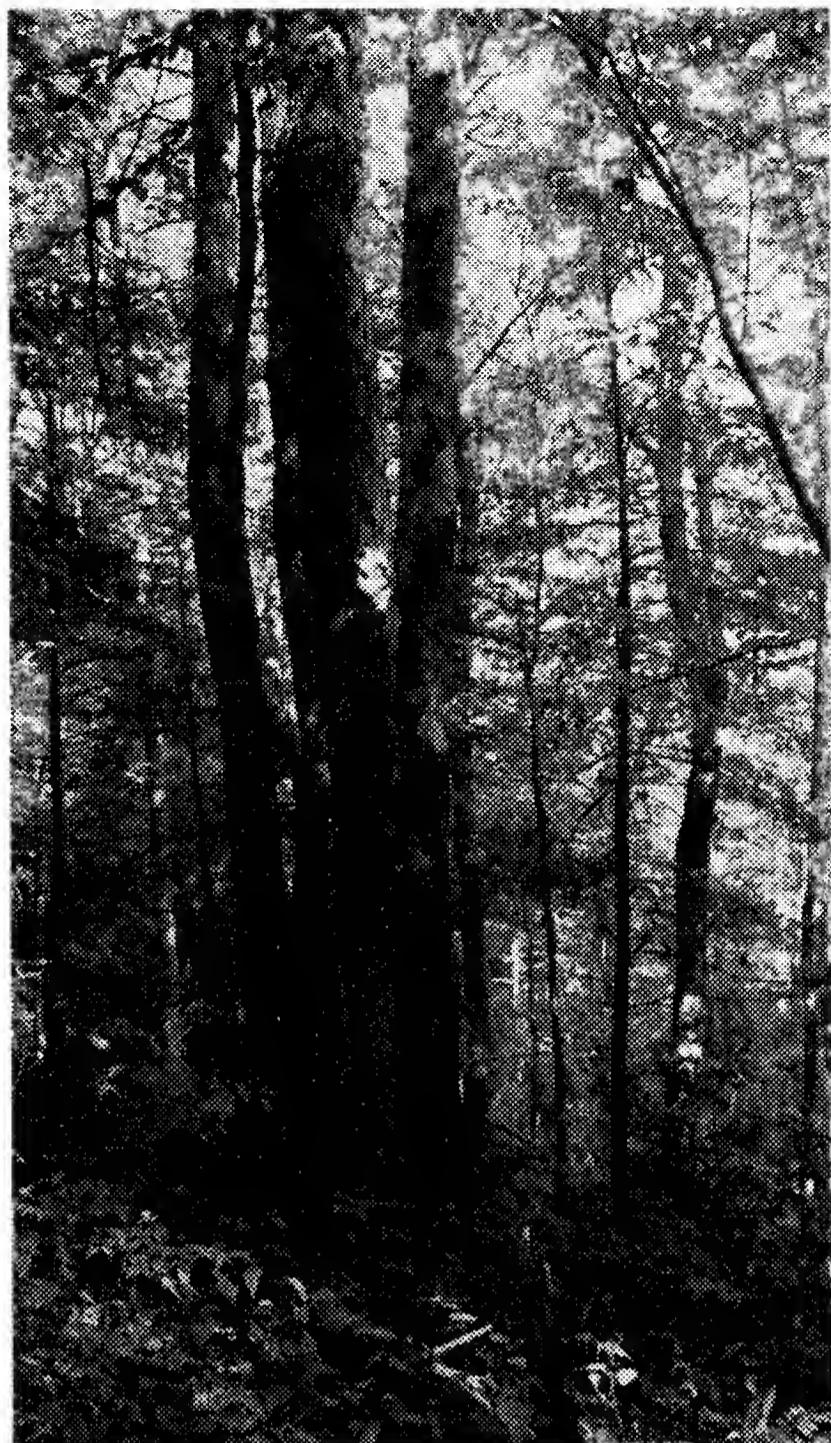
Because old growth stands in the southern Appalachian forests do not reach biological maturity for 200 to 400 years, and perhaps longer to be well represented in the senescence or dying categories, present-day regrowth hardwood forests must be left free of disturbance for at least another 150 years. Even then many micro-habitat niches provided by old windthrown trees, standing dead snags, and rotting logs will not become available for another century. More importantly, most of the plants and animals of our second growth forests are mid-successional and are not those which will eventually be present in climax communities. The maturing forests of today will undergo dynamic changes in species composition if left undisturbed until they reach a condition of biological old growth.

As today's forests continue to mature, the ground in many places will be carpeted with large colonies of painted trillium (*Trillium undulatum*),

baneberry (*Actaea pachypoda*), dog-tooth violet (*Erythronium americanum*), umbrella-leaf (*Diphylleia cymosa*), jack-in-the-pulpit (*Arisaema triphyllum*), and many fern species. Rotting logs will provide substrate and micro-habitats for many species of fungi, mosses, liverworts, and all the attendant invertebrate and small vertebrate animals, which are unseen and generally uncounted, yet are essential to the health of the entire larger community. Add to these the many birds, including several species each of owls, warblers and woodpeckers, and other vertebrates that require a biologically mature, undisturbed mixed hardwood forest for their food, shelter, and breeding habitat. Such a biotic community is dynamic with life processes supporting a large array of life forms.

In the above example, not one of the plants or animals in itself is today exceptionally rare; although any of a number of today's threatened or endangered species, such as the small whorled pogonia (*Isotria medeoloides*) and certainly ginseng (*Panax quinquefolius*), could make a comeback in such habitats. The point is, such a *combination* of these species, taken together as a functioning ecosystem, is today a rare occurrence.

Thus the second level of biodiversity—species diversity within habitats—is today well represented only by the weedy and seral species common to our man-disturbed habitats. Maturing forests are evolving from these seral communities, however, with species enrichment occurring slowly in those habitats that are left undisturbed. The potential exists, therefore, for restoration of this level of diversity. Migration and dispersion of non-weedy, forest interior species into undisturbed, maturing forests will likely continue indefinitely. Biologically mature habitats, or old growth mixed hardwood forests, are again a possibility in the southern mountains within the next century.



A fragment of mixed hardwood old growth on mountain national forests. Although preserved from harvest, this 10-acre stand contains few interior animal species because it is surrounded by young, intensively managed forests. (Photo courtesy the Appalachian Environmental Art Center)

Just as phenotypic diversity within a species is essential for evolution to adapt that species for survival in a changing environment, so is species diversity within a habitat essential for the whole community of interdependent plants and animals to adapt. When any species is extirpated from a biotic community, a strand is broken in the life support of that community, and *all* other species are affected. Science has not yet learned the subtleties of these connections, but the breakage in food chains and loss of shelters are obvious consequences. A fundamental law of ecology is the reciprocal relationship

between the health of the ecosystem and the well being of each individual organism. The future of those species combinations best adapted to old, mature hardwood forest communities depends on the integrity of the entire habitat.

Habitat Diversity

The third level of biological diversity—habitat diversity in the regional landscape—has also been gradually emerging in the southern Appalachian Mountains throughout the second half of this century. The National Forests provide large contiguous blocks of forest area, which, if they continue to be left undisturbed, have the potential to mature into a mosaic of diverse old growth forest habitats. The key requirement for this regional diversity lies in maintaining a continuity of undisturbed habitats across the landscape. Disconnected mature habitats, left to mature as fragments isolated one from the other, cannot serve as more than small refugia for genetic material. As discussed in the first and second levels of diversity, such a limitation confines genetic variation to the specific environment of each habitat, leading to inbreeding, loss of species, and inability of the entire community to respond to future changes in environment.

The current policy of National Forest management to accommodate landscape diversity is to preserve fragments of old growth stands dispersed across the region. Interspersed among these are many even-aged managed stands of younger ages and of commercially important species of trees and game animals. This concept of diversity is analogous to the preservation of species in arboretums, botanical gardens and zoological parks. Certainly a turk's cap lily (*Lilium superbum*) in a cultivated garden has lost its wild "personality," because a wildflower removed from its natural habitat is no longer serving its role as a strand in the web of life. In like manner, a fragment

of old growth forest preserved in a landscape of managed young forests has lost its "old growthness." Its myriad strands are no longer connected to the regional web vital to the biological evolution of itself and of the region its genetic material serves.

The black bear, *Ursus americanus*, is an excellent example of a species requiring landscape level mature habitat. This animal is wide ranging, with adult males requiring over 30 square miles of *contiguous* forest habitat for food and shelter. Preferred habitat is mature hardwood forest, and quality denning sites are essential to gestational female survival. Very large, hollow living trees, dead snags, and downed logs comprise the most suitable denning sites, conditions characteristic of old growth forests. The black bear is considered by wildlife ecologists to be the best indicator of a healthy, mature forest, contiguous over large areas. Since this animal represents the top of an omnivorous food chain, a landscape that supports a viable, reproducing population of black bears contains the ingredients for fully functioning mature ecosystems.

At this highest level of biological diversity, just as at the two lower levels, the ability of an entire bioregion to adjust to and survive environmental change lies in the diversity among its natural habitats. The greater the number of mature habitat types represented on the landscape, the more stable the entire region. With the acceleration of man-caused environmental changes, species normally adapted to ridges must migrate to midslopes, and species adapted to slopes may have to migrate to coves. Species normally found at mid-elevations may have to migrate to higher, cooler habitats.

Ecologists believe the natural ranges of species will have to shift from south to north, requiring genetic exchanges across the region. Migration of all but highly mobile, weedy species of both plants and animals occurs only on adja-

cent sites. During and following the advances and retreats of continental glaciers, forest communities easily migrated at a rate of a few miles per century as the climate cooled or warmed over thousands of years. In the coming century, however, individual species and entire communities may have to migrate at a rate perhaps ten times faster, an impossible feat from isolated, fragmented old growth habitats.



Today's second growth mountain forests are well on their way to old growth. This 80-year forest is halfway there, but it is also a prime target for clearcutting.

Optimum regional biodiversity therefore requires continuity of habitats contiguous over the landscape in a mosaic of mature communities. As we have seen, all topographic conditions—ridges, north slopes, coves, south slopes, streams and gorges, balds

and bogs—must be included. Federal protection is recently extended to many of these latter-named communities, those that support no commercially important timber resources, through Congressionally designated Wilderness Areas. But nearly all of the remainder, the large areas of contiguous second growth forests that are becoming economically mature, are allocated for harvesting, primarily by clearcutting!

The Potential to Restore Old Growth Diversity

Today we stand at the threshold of making one of the most important decisions about the use of our public lands since the creation of the National Forests. A land ethic, based on sound ecological principles for habitat management, is needed to protect and preserve large areas of mature forests for the future health and natural evolution of species that require forest interior habitats. The present orientation toward timber and game management is not going to maintain regional biological diversity in its broadest sense.

The United States 100th Congress stated, “The Earth's biological diversity is being rapidly depleted at a rate without precedent in human history.... Most losses of biological diversity are largely avoidable consequences of human activity.... *Maintaining biological diversity through habitat preservation is often less costly and more effective than efforts to save species once they become endangered.*”

(Quote from H.R.4335, 1988. Italics added.) The Society of American Foresters agrees, in a recent position statement, that “...there is a compelling need to rehabilitate old growth forests throughout the United States and the world.... The best way for management to create old growth is to conserve an adequate supply of present second growth forests and make the long-term commitment to leave them alone.”

On the National Forests of the Southern Appalachian Mountains, we

are well on our way toward restoring entire landscapes of the 150- to 200-year old forests that begin to stabilize as old growth. This rehabilitation has occurred in the 65 years since the mountain National Forests were established. I repeat, *we are halfway there.*

We read and hear daily the warnings of distinguished biological scientists that man-caused destruction of natural habitats is the single most serious threat to survival of life as we know it on our planet. The loss of genetic diversity and the loss of entire ecosystems are occurring at an accelerated pace from oceans, deserts, tundra, grasslands, and

forestlands. Our Southern Appalachian Mountains are part of this world picture. Unbroken, naturally functioning habitats must be restored here to provide refugia for the basic life support systems crucial to carrying all forms of life through the unfolding ecological catastrophe of our times.

We come to the crucial question of our times: As we approach the 21st century, what is the highest and best use of our National Forests in producing the greatest benefit over the generations to come? Can we extend this beyond commodities for people to the health of the global ecosystem?

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To a Pitcher Plant By Sarah Anne Staples

Exotic trap
With silent "snap"
Your dinner comes to you!
What the habitat lacks
You get in your snacks
With enzymatic goo!

Recent additions to Georgia's protected plant list

Newly designated protected plants make Georgia's list of rarities impressive

By Thomas S. Patrick

Illustrated by Vicki Holifield

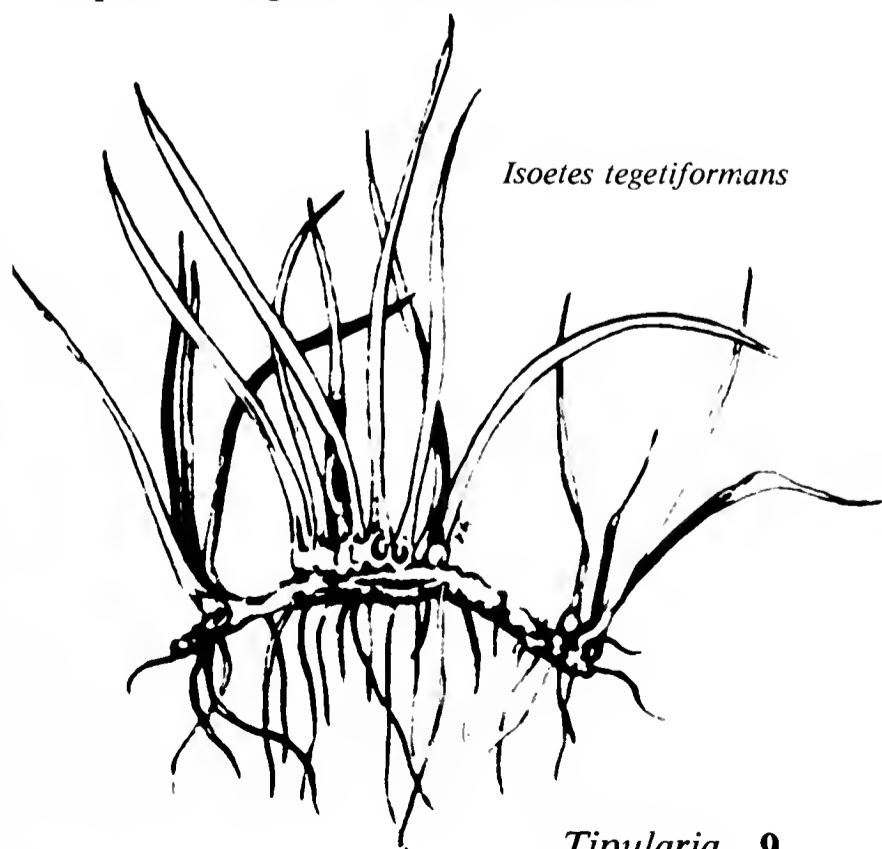
SINCE THE PASSAGE of the federal Endangered Species Act in 1973, Georgia has had 17 species of vascular plants, including two fern allies, designated as either Endangered or Threatened. An earlier account provided some history of the first listed species (see *Tipularia*, May 1987 issue). In the present discussion, additions to the official list of federally protected plants will be presented.

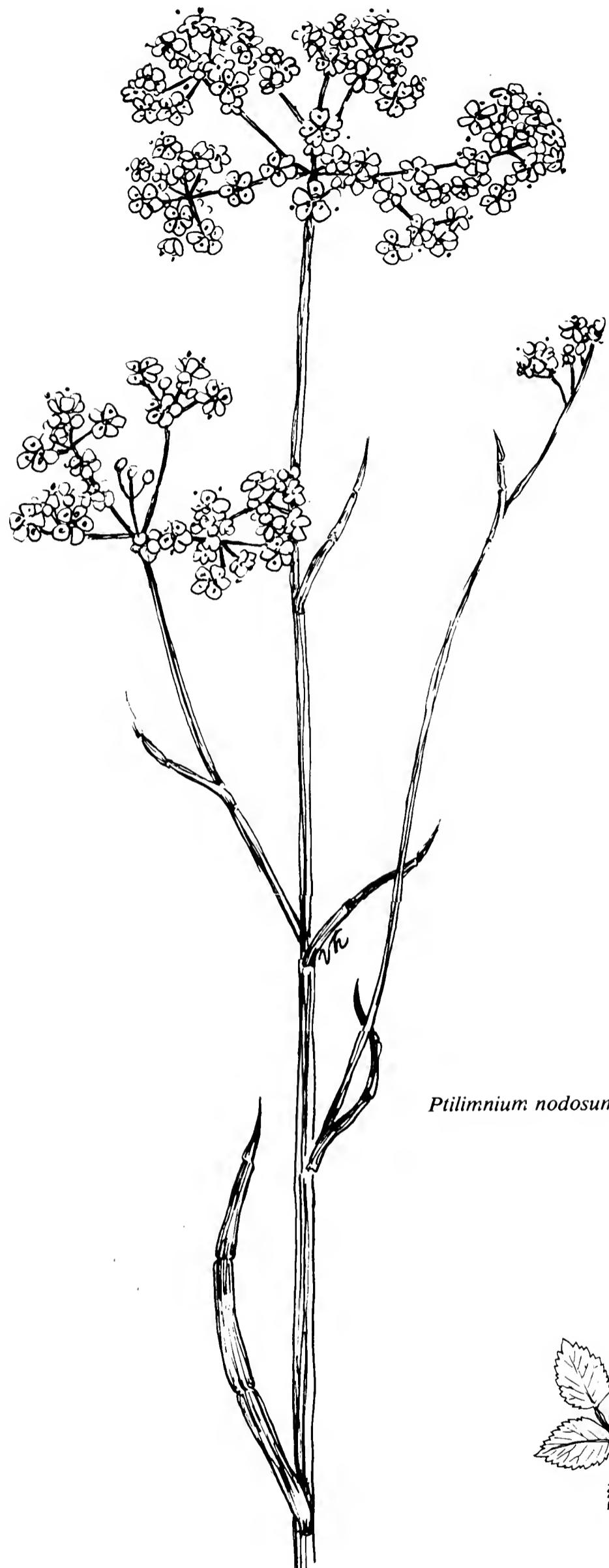
Significantly, the Georgia Department of Natural Resources, through its Protected Plant Program and its ongoing study of Georgia's rare plants (an effort now called the Freshwater Wetlands and Heritage Inventory), maintains records on more federally protected species than any other southeastern state, with the single exception of Florida. Whereas in 1987, a grand total of eight species were listed under the federal Endangered Species Act, Georgia can now boast of nine additions. The list of newly added species contains some surprises, as well as some old friends that BotSoccers have been observing for many years.

Granite outcrops are Georgia's most famous Piedmont habitats. Outstanding examples are Heggies Rock near Augusta, Panola Mountain and Stone Mountain near Atlanta, and Camp Meeting Rock north of Columbus. Three newly listed species are granite outcrop endemics. They are pool sprite (*Amphianthus pusillus*) and two quillworts (*Isoetes melanospora* and *I. tegetiformans*), the latter being peculiar fern allies that bear male and female hard-cased spores under flaps at the base of quill-like leaves. Pool sprite is a remarkable member of the Figwort Family. Jim Allison, our resident expert on the flora of granite outcrops, regards this aquatic annual as the "snorkelwort," because of the way some of the leaves and flowers are

borne on the ends of filamentous stalks that bend and twist their way to the water's surface. Indeed, the plants of Georgia's granite outcrops are among the best examples of adaptations to specialized habitats. Probably other species limited to acidic outcrops (gneiss, granite, sandstone, Altamaha Grit) should be listed, including one of the dodders (*Cuscuta harperi*).

Perhaps the most obscure newly listed species is harperella (*Ptilimnium nodosum*). This member of the Carrot Family is named for Roland Harper (see *Tipularia*, November 1987 issue), premier collector of Georgia plants in the early 1900's. Harper discovered the species near Ellaville in Schley County in 1902. Because it has small, white flowers arranged in a flat-topped cluster, harperella resembles wild carrot. However, the leaves are hollow and quill-like with conspicuous cross walls instead of being delicate and fern-like as in wild carrot. It grows in wet areas, especially in seeps, whitewater shoals, gravel bars, or on pond margins. This plant has proven to



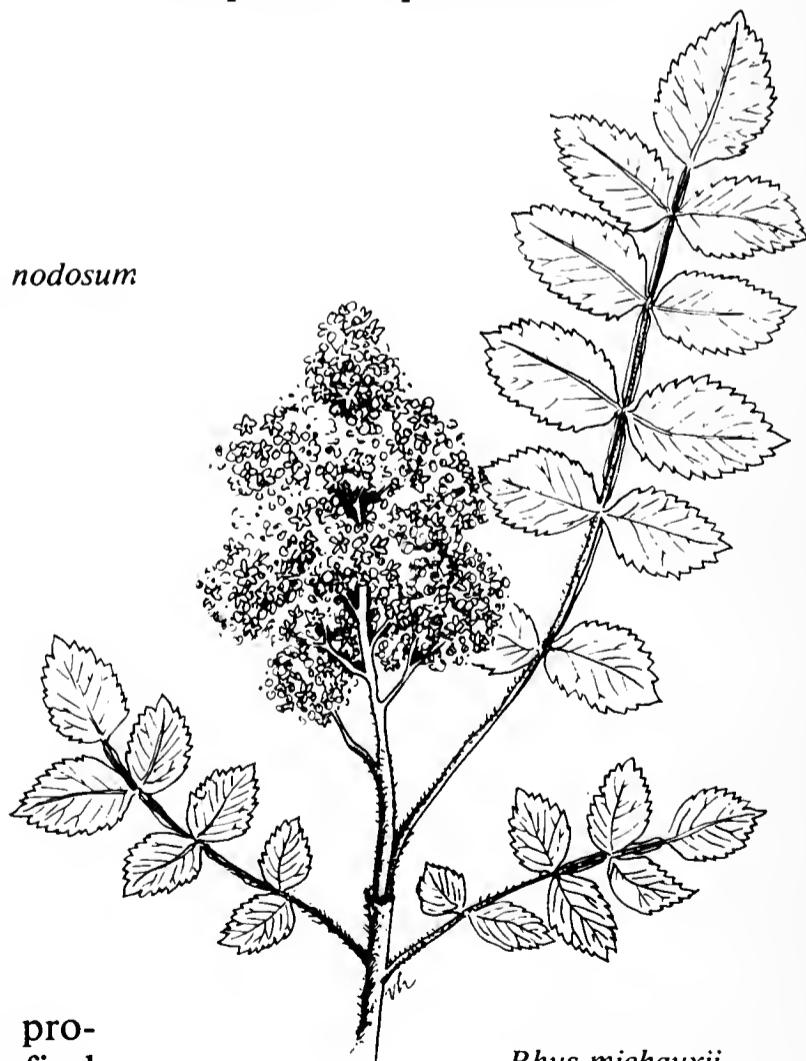


Ptilimnium nodosum

be Georgia's most elusive federally protected species. Recent efforts to find harperella where originally discovered have been unsuccessful. Our only extant site is a

tiny granite outcrop seep where the number and location of plants change dramatically from one year to the next!

Perhaps one of the least likely candidates for significance as a rare plant is anything closely related to poison ivy or winged sumac — yet one of the newly protected species is a sumac! Michaux's sumac (*Rhus michauxii*) grows two or three feet high and is known from fewer than 15 populations in the Carolinas and Georgia. Without fire, bush-hogging, selective cutting, mowing or other disturbance, a stand of any sumac would disappear, for these are shrubs occupying early stages of plant succession; thus, some stands of Michaux's sumac may have died out naturally as more shade tolerant trees overshadowed them. Georgia's only known surviving population consists of six vegetative stems, but plans are underway to enhance the vigor of these remaining shoots. The population is on a rocky hilltop on public lands managed as part of the Broad River Wildlife Management Area. One advantage of designating a rare plant as legally protected is the attention such action draws to the well-being of the species on public lands.



Rhus michauxii



Trillium reliquum

Georgia, the state in which more kinds of trillium grow than any other, now has two species federally protected. The persistent trillium (*Trillium persistens*) was one of the first to be protected back in 1978, but in 1988 a second species, the relict trillium (*T. reliquum*), became officially Endangered. The relict trillium prefers moist hardwood slopes near the Fall Line and limesink terraces mostly on the Coastal Plain. The term "relict" has an historical connotation in that populations of relict trillium now occupy widely separated areas, such as the bluffs along both the Savannah and Flint Rivers. According to Dr. John Freeman, the Auburn University botanist who described relict trillium, this species may have occurred more frequently in a band along the Fall Line from eastern Alabama to western South Carolina. Searching for new sites with rarities as conspicuous as trilliums is a pleasing experience. For example, the Kinchafoonee and Muckalee Creek Basins north of Albany have proven to harbor hitherto unreported sites for relict trillium. This region has blue springs, north-facing bluffs, and limesinks with a rich vernal flora.

Most spring and summer wildflower enthusiasts recognize meadowrue in the Buttercup Family. Did you realize Georgia has no fewer than 10 species, if you include the one with white petals sometimes put in the genus *Anemonella*? Rue anemone (now regarded as a true meadowrue, *Thalictrum thalictroides*, instead of *Anemonella thalictroides*) is the only species with showy petals, all others having greenish to purplish, tiny petals. In the place of showy petals is a cluster of stamens, sometimes colored white (as in the species that likes

seepy overhangs and waterfalls). Some species stand tall at about six feet, others are dwarf and reach barely half a foot. Some, like the Cooley meadowrue (*Thalictrum cooleyi*), newly listed, have delicate stems that lean on adjacent vegetation. Cooley meadowrue has narrower leaves than any other species. Dr. Wayne Faircloth, a botanist specializing in the flora of South Central Georgia, has relocated Georgia's only known population of this tall, lanky, summer-blooming meadowrue. Although its identification has been questioned by some, this author makes no distinction between Dr. Faircloth's material and "good" *Thalictrum cooleyi* found in the Florida Panhandle. One challenge botanists have when dealing with rare plants is inadequate descriptions in the scientific literature of the natural variation expressed by such extremely uncommon plants. By finding additional populations, hopefully new information can be gathered on how to distinguish these species.

Certainly one of the rarest habitats in Georgia is the Blue Ridge mountain bog community with sheep laurel (*Kalmia angustifolia*), purple or northern pitcherplant (*Sarracenia purpurea*), and perhaps a few other goodies, such as bog turtles, masses of cottongrass (*Eriophorum virginicum*) and the newly protected gorgeous member of the Lily Family, the swamp pink (*Helonias bullata*). Only one occurrence of swamp pink is documented in Georgia. This is a private bog, where the landowner has repeatedly tried to drain an adjacent field and, thereby, severely impacted the hydrology of the mountain bog. One of the most important goals of the Protected Plant Program is to work with other

conservation groups, such as The Nature Conservancy, to engender an interest in the landowner for perpetual stewardship of such sensitive habitats. Swamp pink is one of the plants that could easily disappear from Georgia without constant monitoring of the site, improved and unimpeded natural waterflow, and protection from overly enthusiastic visitors and pernicious collectors.

Barbara buttons are attractive members of the Aster Family. They have no ray flowers — only pinkish disk or tubular flowers in a button-like head. They prefer sunny habitats and often grow in roadside ditches or in openings in flatwoods on Georgia's Coastal Plain. The rare Mohr's Barbara buttons (*Marshallia mohrii*), our last newly protected plant, is endemic to dry, shallow, shale-derived soils of the Ridge and Valley Province in Northeast Alabama and Northwest Georgia near Rome. Its preferred habitat is a grass-sedge community resembling a wet prairie, as found along streams or in swales of pastoral meadows. A few old observations of this species in Georgia, one dating back to 1890's, have never been relocated, and several of the recently documented Alabama populations have disappeared. There are presently about 14 populations worldwide, most of which contain few plants.

Georgia has additional species worthy of protection at both the state and federal level. Efforts are underway to add Virginia spirea (*Spiraea virginiana*), Kral's water plantain (*Sagittaria secundifolia*), chaffseed (*Schwalbea americana*) and monkeyface or white fringeless orchid (*Platanthera integrilabia*) to the federal list. The same is true at the state level, where, in addition to those just noted, plants of the Altamaha Grit, the longleaf pine-wiregrass community, and newly reported Georgia plants are being evaluated for listing. Information is needed on threats to the habitats of these rare species, and concentrated searches are required to determine whether or not new populations can be found. In the meantime, work continues on preserving the best remaining populations of all protected species. The task is a formidable one!



Marshallia mohrii

*Georgia's Federally Protected Plants**

Isoetaceae

(Quillwort Family)

Isoetes melanospora,

black-spored quillwort, 1988

Isoetes tegetiformans, matforming
quillwort, 1988

Taxaceae

(Yew Family)

Torreya taxifolia, Florida torreya, 1984

Liliaceae

(Lily Family)

Helonias bullata, swamp pink, 1988

Trillium persistens,

persistent trillium, 1978

Trillium reliquum, relict trillium, 1988

Orchidaceae

(Orchid Family)

Isotria medeoloides, small whorled
pogonia, 1982

Ranunculaceae

(Buttercup Family)

Thalictrum cooleyi, Cooley
meadowrue, 1989

Lauraceae

(Laurel Family)

Lindera melissifolia, pond
spicebush, 1986

*Year of listing indicated

Sarraceniaceae

(Pitcherplant Family)

Sarracenia oreophila, green

pitcherplant, 1979

Fabaceae

(Legume Family)

Baptisia arachnifera, hairy
rattleweed, 1978

Anacardiaceae

(Cashew Family)

Rhus michauxii, Michaux's
sumac, 1989

Lamiaceae

(Mint Family)

Scutellaria montana,
largeflower skullcap, 1986

Scrophulariaceae

(Figwort Family)

Amphianthus pusillus, pool sprite, 1988

Apiaceae

(Carrot Family)

Oxypolis canbyi, Canby dropwort, 1986
Ptilimnium nodosum, harperella, 1988

Asteraceae

(Aster Family)

Marshallia mohrii, Mohr's
Barbara buttons, 1988

Research Report

Edited by Harriett L. Whipple

Georgia Botanists presented papers and received honors at the Association of Southeastern Biologists on April 18-21 in Baltimore, hosted by Towson State University.

They were: James F. Matthews, University of North Carolina at Charlotte and Wayne R. Faircloth, Valdosta State College: "An Update on the Genus *Portulaca* in the Southeast."

Don Drapalik, Georgia Southern College: "Survival and Recovery Responses of Flood-

ed, Vascular Plants in the Big Muddy River Valley, Jackson County, Southern, Illinois."

Sandra T. Bowden, Agnes Scott, was elected President-elect of the Association of Southeastern Biologists.

Nancy Coile, North Georgia College, was elected one of the editors for *Castanea*.

Wilbur Duncan, University of Georgia, received the Elizabeth Ann Bartholomew Service Award from the Southern Appalachian Botanical Club.

The following papers were presented at the Georgia Academy of Science on May 4-5 at Mercer University:

(Continued on p. 19)

Computerization of the DeKalb College Herbarium

By George Sanko

ONE OF THE BEST kept secrets in the state of Georgia is the herbarium at DeKalb College. The DeKalb College Herbarium houses approximately 23,000 specimens of the vascular flora of the United States. Although the number of plants is small when compared with the 175,000 plants housed at the University of Georgia Herbarium, what makes the DeKalb College Herbarium unique is that it contains approximately 4,300 species, subspecies and varieties. This number compares favorably with herbaria in many of the smaller state universities throughout the country.

It was not until 1969 that the DeKalb College Herbarium began its meager existence. From 1969 to 1982 the number of species added to the herbarium was extremely small due to a lack of interest. At this time only 1,700 species were housed in the herbarium. From 1983 to the present time the addition of new species has proceeded at a frantic pace; some 2,600 new species were added to the herbarium to bring the total to its present count.

The following chart is a summary of the flora in the DeKalb College Herbarium.

	Ferns/ Allies	Gymno- sperms	Monocoty- ledons	Dicoty- ledons	Totals
Families	20	9	30	153	212
Genera	55	26	222	934	1,237
Species	175	91	704	3,334	4,304

Probably the most outstanding feature of the DeKalb Herbarium is that it is fully computerized. The process of computerizing the herbarium began in early 1985, but, due to the inefficiency of the software and hardware of the Apple computer, the process was cumbersome and had to be discontinued.

The computerization of the herbarium was revitalized in 1987. The Appleworks program was selected as the software because of its simplicity and flexibility. The Ramworks hardware was selected because it dramatically increases the speed and power of the Apple computer, not to mention that it allows the storage of documents of up to 1,000 pages in length.

Using the Appleworks program as the database, the following information was recorded for each plant.

Botanical Name: (scientific name of plant)

Common Name: (common name of plant)

Family: (botanical family that the plant is a member of)

Group: (ferns/allies, gymnosperms, monocots, dicots)

State: (state in which plant was collected)

County: (the county in Georgia in which plant was collected)

Found in Georgia
(F.I.G.): (plant also found on UGA plant list)

Habitat: (examples—granite outcrop, northern bog, alpine tundra)

The above data will allow the computer to perform the following functions:

1. Print a plant list of all 4,300 species. This facility allows for updates on a yearly, monthly, weekly or even daily basis if one wishes. We are presently printing monthly updates.
2. Sort by family. With the stroke of a few keys, one can obtain a printout of the *Liliaceae*, *Asteraceae* or *Orchidaceae* or any of the 200-plus families found in the database.
3. Sort by genus. With minimum effort one could obtain a printout of the genus *Solidago* (goldenrods) or any of the 1,200-plus genera found in the database.
4. Sort by state. This facility allows for printouts of all the plants collected in a particular state such as Georgia, Oregon or Colorado. This also allows for recording valuable distribution data.
5. The F.I.G. allows for printouts of all the plants in the DeKalb Herbarium that are also found in the University of Georgia Plant List. The University of Georgia Plant List shows some 3,100 species that have been found in Georgia; the DeKalb College Herbarium houses over 2,300 of these plants.
6. Sort by habitat. This category is the newest added to the database. It will take approximately two years to determine the types of habitats that will be used, to physically check each specimen in the herbarium, and to type this information into the computer.

Anyone wishing to visit the DeKalb Herbarium to examine the plants or have access to the computer may call George Sanko at (404) 244-5065 or Bob McDonough at (404) 244-5068. Any Bot Soc member wanting a copy of the DeKalb College Plant List may send a request to George Sanko, DeKalb College South Campus, 3251 Panthersville Road, Decatur, GA 30034.

“Botany Reade”

An Old-fashioned Professor

By Miriam Talmadge

JOHN MOORE READE was not only an excellent botanist, but a man whose vigorous curiosity led him to take an interest in many phases of human activity in addition to his specialty. He was not a scholar confined only to “book learning,” but spent many enthusiastic hours in the field.

Unlike many of today’s professors, Reade did not write a single book (except an unpublished work). He was happily unconfined by the modern “publish or perish” command and was thus able to devote his time to becoming an excellent teacher and field worker. His unflagging enthusiasm for his work led people to call him “Botany” Reade.

John Moore Reade was born in Toronto, Canada, in 1876 of parents who had moved there from England. He received his Bachelor of Science degree in 1901 from the University of Toronto and then went to the Philippine Islands as Supervisor of Schools from 1901 to 1904. At this time he travelled extensively in the Orient, in India and in Europe, and in 1905 he



studied in Munich, Germany. He received the Doctor of Philosophy degree from Cornell University in 1907, having been awarded the Goldwin-Smith Fellowship of that institution. He came to the University of Georgia in 1907, where he became Director of Biological Sciences and Professor of Botany. He held these posts for thirty years, and was recognized as one of the South’s most eminent teachers of science.

Dr. Reade was a member of Sigma Xi, Phi Beta Kappa, Gamma Alpha, Phi Kappa Phi, the Botanical Society of America, American Society of Plant Physiologists and was a Fellow of the American Association for the Advancement of Science.

In Athens he married Julia Drysdale. Their three children were John M. Reade, Jr., William Woodthorp Reade and Julia Drysdale Reade.

Through the years the professor amassed a collection of southern woody plants about which he wrote: "I have walked a distance of more than three times around the world, and have collected in 536 counties in the last forty-one years." This collection was eventually left to the University of Georgia Herbarium which Professor Reade started in connection with his work in botany.

His field work led him to discover and name a blueberry bush: *Vaccinium ashei* Reade. Dr. Reade's detailed description of this plant is published in *Torreya*, Vol. 31, pp. 71-72, 1931. He wrote: "A slender shrub 2-6 m. high, usually several stems to the clump and the branches often in irregular whorls; bark brown and stringy.... Flowers appearing in February to April, before the leaves are half grown, in short 4-10 flowered glabrous clusters which are often racemose on the twigs. Corolla white or rarely striped with red, oblong-urceolate, narrow, more than twice as long as thick, 8-10 mm. long, rarely 4-5 mm. thick, much constricted at the mouth, Calyx glabrous, about a third the length of the corolla, with acute or obtuse entire appressed lobes which on the distended mature fruit become mere margins."

He discussed the plant's habitat: "The proposed species is common in western Florida and the adjacent portions of Georgia, especially near the coast, and extends west to Pearly River County, Mississippi, and as far east as Baker County, Florida. It grows in sandy or mucky-soiled swamps, especially swamps of clear-water streams usually associated with water gum of small size, with slash pine, white bay, holly, titi, wax myrtle and azaleas. Near Pensacola it is being cultivated under the name of 'rabbit-

eye huckleberry.' On account of the large size of the fruit and its fine flavor it seems to be a most desirable sort for cultivation on the sandy soils of the coastal plains region. The fruit ripens somewhat irregularly, however."

In the classroom it was "no nonsense." He was considered a tough teacher, giving short shrift to inattentive football players and other borderline students, but he was enthusiastically admired by the bright boys.

A friend of mine remembers that she took an elementary botany course under Professor Reade in 1928. She described him as a small man who was "slightly rumpled," and said that she liked him even though he "snarled at wrong answers." On the first day of class she was told to examine a slice of potato under a microscope and to draw a picture of it. After she had done this, Dr. Reade called her into his office and said: "Do you think this is what a potato slice looks like under a microscope?"

My friend, slightly intimidated, answered, "Well, yes, I do."

"Go and do it over again," he ordered.

Meanwhile, she had seen an illustration in the text book of what this slice should look like, and her second attempt was acceptable.

She became much interested in the course work, and at the end of the quarter, Dr. Reade called her in again, this time with a different question.

"Would you consider the possibility of changing your major?" he asked.

Startled, my friend replied: "Well, no, I have always intended to major in English. Why do you ask?"

Dr. Reade smiled and said: "It's a pity. I believe you would make an excellent botanist."

In addition to his interest in botany, Professor Reade was a genuine lover of flowers and produced in his home garden some remarkably fine specimens. He lived on Cloverhurst Avenue in Athens, and it was in this garden that he propagated irises, grew double syringas, peonies and beds of old-fashioned, fragrant roses. A friend remembers that his rose beds had a charming border of parsley. Some of these plants that he worked with survive to this day in gardens carefully tended by members of his family.

A story still told around Athens about Dr. Reade is that he was very often seen working happily with his flowers on a Sunday morning. Once a neighbor, walking past the Reade house on his way to church, was irritated to observe that this man, busy with his gardening, was obviously not intending to go to church himself. The neighbor apparently felt it his duty to report this fact to the Chancellor of the University. We have no record of the Chancellor's reaction, but the story did get back to "Botany" Reade, and one version of the tale is that from then on he propped a shotgun up beside him as he did his Sunday morning gardening.

A project in which Professor Reade became very much interested in 1926 was the establishment of a camp in the Georgia mountains where the natural sciences would be taught. He and his family had established a summer home in the mountains, and he did a great deal of field work in this area. It was his opinion that although science was taught throughout the South, teachers were poorly prepared and not much interested in this subject. Thus teachers as well as students would benefit from the camp, not to mention nature clubs and conservationists. Reade thought that the South was not taking enough

part in the growth of science. A real aim of the venture was to establish an institution for scientific research.

Dr. Reade wrote a short monograph on this subject, called, "A Camp Nature School—The Prospectus of an Idea." (This booklet is in the University of Georgia Library.) The book goes into considerable detail about all aspects of the plan from an outline of the curriculum and details of a building plan, which included a museum, to the cost of such a venture. Subjects to be taught were: "General Botany," a collegiate introduction to the general field; "Physiography and Geology of the Region;" "Taxonomy of Seed Plants;" "Mycology;" "Ecology," organisms in relation to their surroundings; and "Genetics," heredity and application of that knowledge. In his introduction to the monograph, Reade wrote: "...our classes are crowded.... Should we say that the natural sciences need an outdoor opportunity? Agassiz said, 'If you study nature from books, when you go outside you cannot find her'."

There was considerable interest in his idea, and Reade received a lot of support. The U.S. Forest Service encouraged location of the camp in the Nantahala or Cherokee National Forests. Clayton, Georgia, and Highlands, North Carolina, were also interested in having the camp in their areas. Letters from Chancellor Snelling and Pope Brock (a prominent Atlanta lawyer at that time) urged Reade to proceed with his idea. Encouragement, however, apparently did not include financial support, since there is no record of the camp ever having been started. These were the days of the boll weevil, and money was scarce.

It was often said that Professor Reade was an excellent teacher, but

perhaps the most convincing proof of this is the fact that one of his students, Frank Palfrey of Texas, left one million dollars to the University Botany Department at his death thirty-five years after studying under Dr. Reade at Georgia. The department has thus been able to plan many special programs, invite distinguished speakers and buy expensive equipment that would otherwise not have been available to it.

John Moore Reade had a reputation among his friends of being a brilliant conversationalist. His obituary in the "Georgia Alumni Record" of June 1937 mentions that "there was no field of learning which his excellent mind had not penetrated."

Reade was known for his wit and charm, but is remembered most of all for the superior quality of his teaching.

Research

(Continued from p. 13)

Pamela G. Bradley and Timothy P. Spira, Georgia Southern College, and Allison A. Snow, Ohio State University, Columbus, Ohio: "The Effects of Water Stress on Pollen Tube Growth in *Hibiscus moscheutos*."

Marcus A. Toole, Jr., and Donald J. Drapalik, Georgia Southern College, "A Floristic Study of the Southern Portion of the George L. Smith State Park, Emanuel County, Georgia," and "Vegetational Analyses of a Lowland Forest and Sandhill on the George L. Smith State Park, Emanuel County, Georgia."

Wayne R. Faircloth, Valdosta State College, and James F. Matthew, University of North Carolina at Charlotte, "A Portulaca Species New to Georgia and the United States."

Andrew Jarcosz, Emory University, was the chief researcher for a DNR project surveying a blight on Oglethorpe oak. This blight resembles chestnut blight, but was found not as threatening as the chestnut blight.

Jim Allison, research field botanist, has completed a survey for the Georgia Natural Heritage Inventory, a program of Georgia DNR. The survey included the following rare plants in southwest Georgia: *Rhododendron prunifolium* (plum leaf azalea), *Sedum nevii* (Nevius stonecrop), *Silene polypetala* (fringed campion), *Arabis georgiana* (Georgia rockcress), *Scutellaria ocmulgee* (Ocmulgee skullcap) and *Trillium reliquum* (relict trillium). Additional studies on *Cacalia diversifolia* (Indian plantain) and *Lythrum curtissii* (rare loosestrife) will be continued during the summer.

Michael O. Moore, University of Georgia received an N.S.F. doctoral dissertation improvement grant for a systematic study of North American *Vitis* north of Mexico. He is also curator of the University of Georgia Herbarium.

Myong-Gi Chung, University of Georgia, received an N.S.F. doctoral dissertation improvement grant to study *Hosta*.

Nancy Coile, North Georgia College, has been working on a grant to help develop the Savannah Research Ecology Lab herbarium reference collection.

Three University of Georgia graduate students have completed their master's degrees in botany and have the following positions:

Bill Houghton is curator at Fairchild Tropical Gardens in Miami.

Carol Howell is a senior biologist with Garrow and Associates, Incorporated, consulting archeologists and biologists, in Atlanta.

Kelly Johnson is pursuing a Ph.D. at Michigan State University in plant/insect interactions.

Tim Spira and Lisa Wagner, Georgia Southern College, will be doing research on the reproductive biology of *Hibiscus* at the Smithsonian Environmental Research Station in Edgewater, Maryland, this summer. Tim has an N.S.F. grant and Lisa a Smithsonian grant for the research. Georgia Southern students Denny Rice, Elizabeth Turner and Dawn Folker will be field assistants on the project.

Dr. Elizabeth Williams has been named chairperson of the Department of Botany at the University of Georgia. Her research interests are plant genetics, genetic engineering and cell biology of higher plant reproductive systems.

MAJOR PROJECTS OF THE NATURE CONSERVANCY IN GEORGIA

I. With the Department of Natural Resources (DNR)

<i>Date</i>	<i>Project</i>	<i>Acreage</i>	<i>Acquisition</i>	<i>Disposition</i>
1968	Panola Mountain	513	TNC purchase	Conveyed to DNR through Georgia Conservancy
1972	Sweetwater Creek	867	TNC	Assigned option to DNR
	Wormsloe	832	Gift	Bargain sale to DNR
1973	Altamaha: Georgia Pacific (Lewis Island)	5,633	TNC	Assigned option to DNR
	Phillips (Big Hammock)	801	TNC	Assigned option to DNR
	Fort Morris (Sunbury Historic Site)	3	TNC	Assigned option to DNR
	Picketts Mill	465	TNC	Assigned contract to DNR
1974	Hofwyl-Broadfield	1,268	Conveyed by estate to TNC	Transfer to DNR
	Providence Canyon	34	TNC	Assigned option to DNR
	Watson's Pond (George L. Smith State Park)	1,432	TNC	Assigned option to DNR
	Pigeon Mountain	60	TNC	Assigned option to DNR
1975	Pigeon Mountain	1,734	TNC	Assigned option to DNR
1977	Pigeon Mountain	2,434	TNC purchased mineral rights	Sale to DNR
1978	Altamaha	1,331	Gift by ITT Rayonier	Transfer to DNR
	Ossabaw	24,411	TNC purchased ½ undivided interest (personal gift by Robert Woodruff)	Sale to DNR
1978	Richmond Hill	22,484	Gift from Int'l Paper	Transfer to DNR
1980	Amicalola Creek	4,715	TNC	Assigned bargain sale option to DNR

II. With the U.S. Fish and Wildlife Service (USFWS)

<i>Date</i>	<i>Project</i>	<i>Acreage</i>	<i>Acquisition</i>	<i>Disposition</i>
1969	Egg Island	607	TNC purchase	Sale to USFWS
	Wassaw Island	10,760	Gift to TNC (\$1 Million)	Sale to USFWS for \$1.00
	Wolf Island	3,464	Bargain sale to TNC	Sale to USFWS
1972	Wolf Island	492	Bargain sale to TNC	Sale to USFWS
1976	Argent Swamp	13,019	Bargain sale to TNC	Sale to USFWS
1978	Okefenokee	14,849	Gift from Union Camp	Transfer to USFWS
1980	Cohutta	5	UGA Fish Hatchery	
1981	Harris Neck	.3	Savannah Coastal Refuges	
1984	Harris Neck	3	Savannah Coastal Refuges	
1985	Banks Lake	3,047	Bargain sale to TNC	Sale to USFWS
1989	Bond Swamp	3,684	TNC	Sale to USFWS

*Provided by Jonathan Streich, Georgia Field Office, The Nature Conservancy



Wild Edibles

Wild Jerusalem Artichokes (*Helianthus tuberosus*)

By George M. Goldman

THE JERUSALEM ARTICHOKE or sunflower artichoke is also called the sunflower root or the wild sunflower. This large perennial sunflower has naturalized throughout the state. Bradford Angier in his "Field Guide to Edible Wild Plants," Stockpole Books, 1974, states: "...these plants like damp, but not wet, ground and can be found growing along roads, ditches, streams, paths, and fences and in abandoned fields and other waste lands from Saskatchewan to Ontario south to Kansas and Georgia. Formerly cultivated in the East by the Indians and later the settlers, it has widely escaped and grows wild throughout much of this area as well as widely scattered parts of the U.S. for the same reason."

Our favorite way to prepare these roots is to brush them well, wash them and cover the bottom of a pyrex or Corning Ware dish with the tubers, splash with squeeze-margarine or butter and sprinkle with any savory salt, then microwave 2 or 3 minutes until done. My children enjoy them as afternoon snacks much as you would enjoy popcorn. The bigger tubers can be cooked with a little water, or steamed and eaten as you would eat new potatoes or can be served mashed with butter and cream.

My introduction to Jerusalem artichokes as a food came one early spring afternoon as I was driving down Old National Highway in College Park. I passed a homemade sign in front of an old house stating: "Jerusalem Artichokes for Sale." I drove in and met a cute little lady who had them in her extra refrigerator on the back porch. I bought a peach basket full for \$2.00, brought them home and refrigerated them. Months later my wife said, "Out they go!" So, I put them out on the back patio in a plastic bag and almost forgot them until I saw them sprouting.

I had one of my friends help me till a plot approximately 8 x 24 feet in my backyard, and we added paper waste, old grass compost, lime and some old peat

moss. The next morning I got on my hands and knees and laid out row beds and planted each tuber until I almost passed out from my private malady—benign positional vertigo. After an hour on the bathroom floor with wet towels on my head, I finally revived and covered the whole area with loose pine straw, watered everything thoroughly and went on to my work place.

In a little bit the shoots came up, and in a few weeks it looked like a patch of bamboo, growing a little taller each day. In a month or so they were a thick, almost 5- to 6-feet tall stand. My wife looked out the bedroom window and was afraid the house might be overtaken. We only had one or two yellow flowers, which was a big disappointment, but after the first frost, I dug up a few small tubers. In the spring I dug a few more with a five blade pruning fork. The next year they were as thick and tall as before, and we dug them throughout the fall.



Eventually, the decision was made to take one half of the bed out. I thought I dug them all up. Ha! If you miss one, or leave a piece of a root, then you get a new plant in the spring. The more I pulled them up, the more they grew! It took five years to remove the rest of the plants, and a few still crop up from time to time.

Bea Stubbs of Mountain City tells a similar story. She cooked a batch one night and pureed them like mashed potatoes in her Waring Blender. She threw the leftovers out the rear door for her cats to enjoy and

the next year was overrun with Jerusalem artichokes! She said it took years to get them out of her side yard.

Seriously, they are easy to raise and are super for diabetics. These roots add variety to salads, plus they pickle more easily than do cucumbers and are good for everyone.

Although they grow wild all over the state of Georgia, the Jerusalem artichoke tubers are sometimes sold in the farmers' markets. If you find them in the wild, mark them well so that you will be able to locate them year after year even when the stalks are down or covered with fall leaves or snow, as most people dig any time after the first frost and on throughout the winter months. They are quite a plus to the season's menu.

Fielding Your Questions

Question: How many kinds of plants occur in Georgia?

Answer: If by plants one means vascular plants, including all ferns, clubmosses, spikemosses, trees, shrubs, vines and herbs, then the real question becomes "how many vascular plants may be found in Georgia?"

There are three modern published accounts of the vascular plants of Georgia; these differ in reliability, taxonomic acuity and purpose so that the number of plants in them vary significantly. Excluding natural hybrids, the 1984 Georgia Botanical Society atlas includes 2,708 plants, the 1988 University of Georgia Herbarium atlas accounts for 3,135 plants and the 1981 checklist prepared by Duncan and Kartesz lists 3,661 plants. The last-mentioned checklist includes numerous species for which proper documentation is still being sought.

Because of the discovery of unpublished state records made within the last few years, plus the documentation of rarities reported from Georgia in obscure literature and found in several herbaria besides the repository at Athens, the figure of 3,600 kinds of plants in Georgia seems to be a reasonable "guesstimate." This number includes subspecies and varieties recognized in reliable monographs, plus naturalized plants (those persisting in the wild but not indigenous to Georgia).—T.S. Patrick

Site-Seeing

A Botanical Learning Lab on the Chattahoochee

By R. Michael Green

ATLANTA'S CHATTAHOOCHEE NATURE CENTER is a living museum. In its outdoor stretches, city folks both young and old are provided the opportunity to observe nature at an arm's length. When I was a youngster, I dreaded vacation Bible school. It was tough to face two weeks of captivity just as I was released from school for the summer. But, there was one benefit that made it tolerable: "field trips." One of these trips was to a nature preserve near Chattanooga, which helped direct me to a life of study and enjoyment in the outdoors.

Surrounded on two sides by a bend of Chickamauga Creek, the nature preserve featured a swinging bridge, labels on specimen trees and plants, plus sightings of various reptiles, birds and insects. It was all presided over by Mr. Robert Sparks Walker, a noted naturalist who lived in a small cabin built in the 19th Century by a Cherokee conjure man.

The small seed of wonder and learning planted there continues to grow with my association with the Georgia Botanical Society. To supplement Bot Soc activities, there exists a similar learning lab convenient to members in the north metro area of Atlanta. It is the Chattahoochee Nature Center in Roswell.

The botanist can explore native and introduced species in environments ranging from pond and stream, to dry ridge, to marsh and swamp. Of particular interest is the wildflower garden, part of a collection of predominantly native plants available for study at the entrance of the main building. Planted and maintained by staff and volunteers led by Ms. Charlotte Reese, staff naturalist and Master Gardener, the entrance grounds feature something of interest in all seasons, from the early bloom of *Hepatica* in the cold spring to brilliant fall color in the sugar and red maples (*Acer*

saccharum and *A. rubrum*). To foster interest in native plants, the Center offers a Spring Wildflower Week in April featuring nursery grown specimens for sale. A fall sale features seeds and plants suited for planting in that season.

The Nature Center can be especially valuable to the beginning botanist seeking additional knowledge in a particular area but whose time for travel is limited. The marshland along the Chattahoochee River offers a variety of species including black willow (*Salix nigra*), jewelweed (*Impatiens capensis*), buttonbush (*Cephalanthus occidentalis*), and arrowhead (*Sagittaria latifolia* var. *pubescens*), a plant whose tubers were valued by the Indians as a food source. A cattail (*Typha latifolia*) marsh is home to many red-winged blackbirds and to dodder (*Cuscuta* sp.) the parasitic vine which drapes like wet, orange candy on the limbs of the host plant in summer.

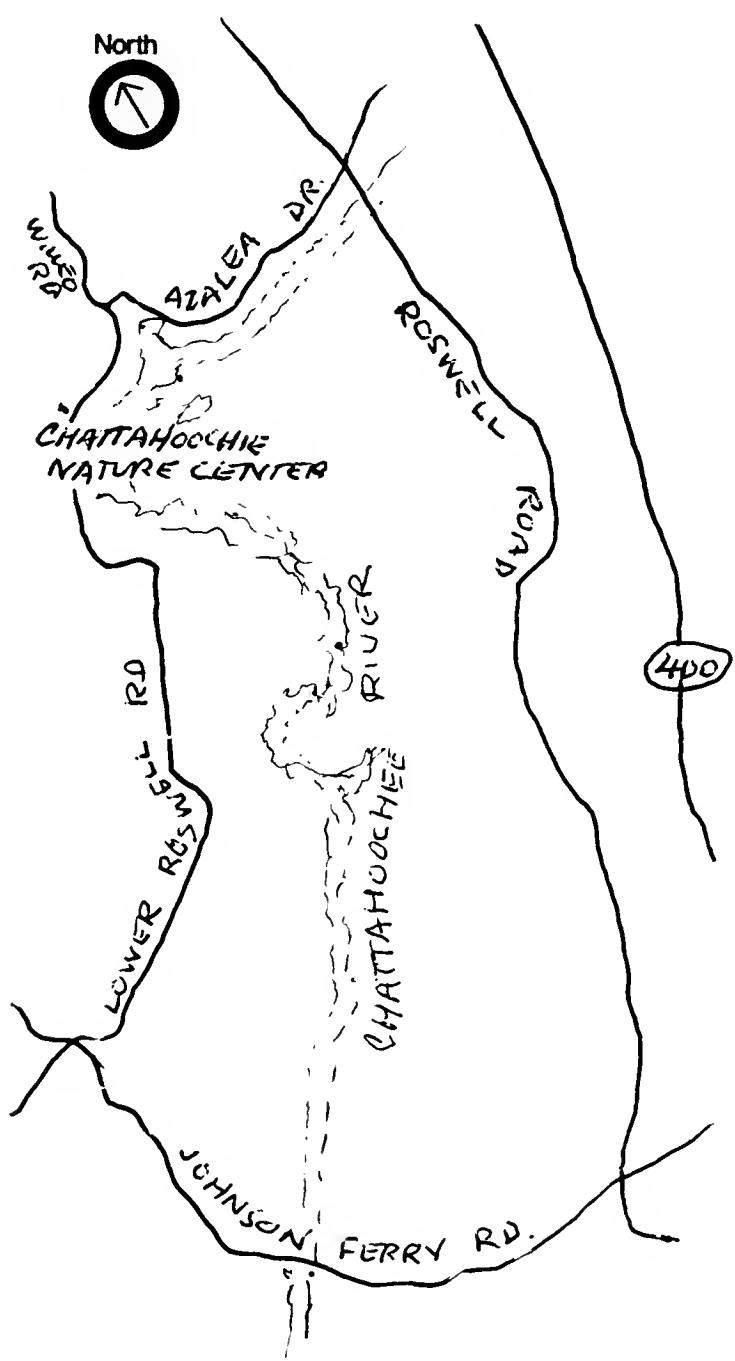
The lakeside features alder (*Alnus serrulata*), thistle (*Carduus* sp.) and huge old willow oaks (*Quercus phellos*). The trail along Kingfisher Lake leads into the oak and hickory (*Carya* spp.) forest, a good example of eighty-year growth on abandoned piedmont farmland. Along the way, a small bog offers opportunity for study. Want to see Oconee Bells (*Shortia galacifolia*)? You'll find them near the bog in spring. These and several other rare species were introduced by Nature Center staff naturalist Henning von Schmeling and others. Several of the introduced specimens have been saved from being destroyed by road and building construction. These rescues include bottle gentian (*Gentiana saponaria*), yellow lady slippers (*Cypripedium calceolus*) and some native azaleas (*Rhododendron* spp.).

The sixty-acre property offers study of lesser-known tree species such as serviceberry (*Amelanchier arborea*), green ash (*Fraxinus pennsylvanica*), tupelo (*Nyssa sylvatica*) and box elder (*Acer negundo*). Mosses, lichens and liverworts are found in abundance. The sweet bay magnolia (*Magnolia virginiana*) perfumes the entrance garden in early summer.

A variety of programs is offered year-round. Guided nature walks take place every Saturday and Sunday at 1:00 p.m. and 3:00 p.m. Membership in the non-profit organization is accompanied by a newsletter, members-only events and a 10% discount in the well-stocked Nature Store. It is difficult for the amateur botanist or birder to leave without adding a volume to his personal library. Wonderful bird feeders of every description are sold along with a good selection of feeds.

The Chattahoochee Nature Center is located at 9135 Willeo Road, Roswell, on the banks of the river. Telephone (404) 992-2055. Hours are 9:00 a.m. to 5:00 p.m., daily, closing only for Thanksgiving, Christmas and New Years. Admission is \$2.00; free to members.

At any season the botanist will find a convenient laboratory for a relaxing study of native flora in a pleasant, easily-reached environment.



Old Monkeyface

By L. Scott Ranger

“FAT CHANCE,” I may have startled Tom Patrick with my flip response to his request that I search for one of Georgia’s rarer plants on Blackjack Mountain. Blackjack, in Cobb County where I live, is rapidly being developed, as apartments with great views of Atlanta’s skyline are in huge demand. That leaves little land on the mountain in any semblance of a “natural” condition. So, certainly willing to go on a little wild goose chase, I let Tom know that that’s all I expected it would be.

“Blackjack Mountain, north side,” is the cryptic site description given on August 14, 1936, by a fellow named Lenmore who collected an orchid called “old monkeyface” (*Platanthera integrilabia*). The description was not much to go on, especially since Blackjack Mountain has two summits. To begin with: which north side?

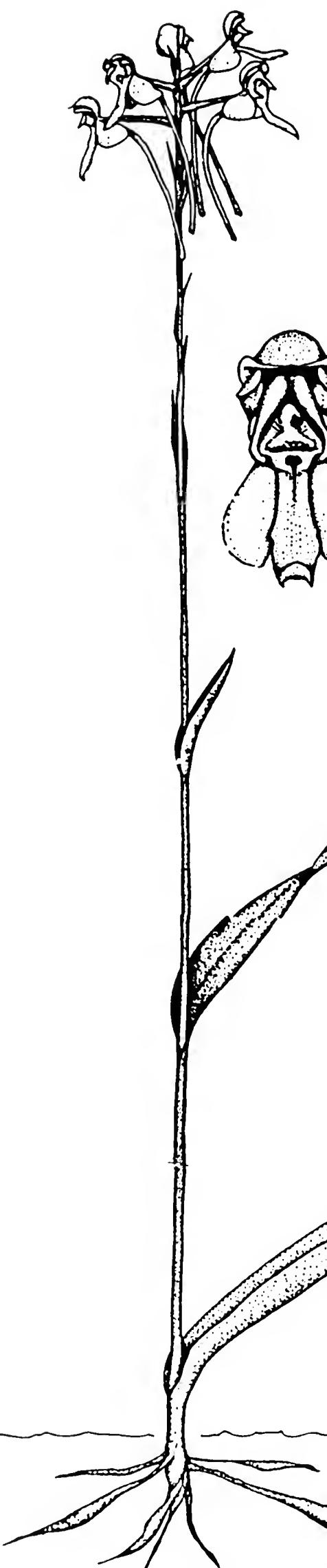
The very idea of finding a rare orchid is pretty exotic, especially in the “wilds” of east Cobb County. And wildness inside urban areas is pretty neat on any level. So I was determined to give it a good shot. My wife Annette and I took several trips driving through the subdivision streets on the north side during the winter, looking for any possibly suitable habitat. We didn’t find anything close, so our next report to Tom was not to expect much.

I do have a friend, Stan Wise, who grew up on the north side of “Big” Blackjack Mountain, so I asked him if he knew of a place on Blackjack that has black, mucky soil which stays wet all year, every year, is mostly shaded but can get a little filtered afternoon sunlight. When Stan indicated that he knew such a place on the mountain, we made plans in mid-summer to go there, and the chase was on.

It was a sticky July 26, 1989, that Stan and I met at his parents’ home and walked up the small creek that flows

through their property. Some pleasing plants such as a cinnamon fern (*Osmunda cinnamomea*) and royal fern (*O. regalis*) were abundant. Warning Stan not to expect much, I gave him a probably unwanted botany lesson on what grew along the creek. We came to a flat spot where the creek pretty much disappeared into black muck, so I used the old eagle eye to search for any prize. I found one green wood-

Illustrated by Larry W. Zettler





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land orchid (*P. clavellata*) and then another and another. We couldn't count how many were blooming there! They were creamy white, with no trace of the accustomed green on the flower. My excitement level was going up—something noticed immediately by Stan with the wry comment, "Ranger, you sure get your kicks in strange ways!"

Searching carefully, we found three large strap-shaped orchid leaves which were quite different from the smaller *P. clavellata*. So maybe old monkeyface was growing here too. Even Stan got so excited that he urged me to call Tom Patrick from his parents' home, but, as usual, Tom was not in the office. When I did speak with Tom later, I told him, "I think I've found your orchid."

His response was amazing. "Scott, let me sit down. You've taken my breath away." This from one who shows great excitement with only a grin? But I had yet to return to see if the big-leaved plant would produce a bloom.

On August 17, 1989, I walk back up the creek to be rewarded with the sight of a very tall, pure white orchid in bloom! It has six flowers and ten leaves on the stalk, rapidly diminishing in size from the single large, strapped leaf at the base. The lip on the flower shows no sign of fringing. It is old monkeyface, also called the white fringeless orchid. My "wild goose chase" proves fruitful!

So excited that I don't even stop to look at the plant but run through the ferns and bamboo laurel (*Smilax laurifolia*) frantically searching for more. None! I slow down and continue up the stream, noticing what looks to be a springhead above. At the springhead there are two more in bloom—one with 13 flowers, the other with nine. I can hardly contain my excitement and begin looking for more large, strapped leaves. Like finding bluets: When you find one, you find a hundred. In this case, I find 49. What an exciting discovery: On a very developed mountain, here is one of the world's rarer orchids!

Two days later, Tom Patrick met me in Marietta on our way up to Starr Mountain, Tennessee, for a Bot Soc field trip, so I could show him the orchids growing on Blackjack. Oddly enough, old monkeyface was one of the promised plants for the field

trip, as Starr Mountain has the largest colony of this rare orchid in the world. So, we go from one of the smallest colonies to the largest in the same day!

Recovering an historic sighting is pretty exciting stuff. Tom gave me two more sites for monkeyface: one from 1949 on Sawnee Mountain near Cumming and one from 1957 on Lee Mountain in Stephens County. There are now three confirmed stations in Georgia, two historic stations, and a possible sixth in Coweta County where David and Sally Emory and I spent a Sunday afternoon on a wild goose chase, finding only one large flower stalk browsed off by a deer. Have to go back next year.

But that's another story.

Book Report

Trees, Shrubs, and Woody Vines of Northern Florida and Adjacent Georgia and Alabama, by Robert K. Godfrey, the University of Georgia Press, Athens, Georgia, 1988 (actual publication 4/13/89). 734 pages with 355 line drawings. \$50.00.

THERE ARE so many excellent features in this book that it is difficult to pick out those to review! Everyone who even thumbs through will be struck by the quality and quantity of Melanie Darst's line drawings. Students of botany will find nearly everything that they could dare to ask for in a guide.

The book covers an area from near Gainesville, Florida (where it meets the northern boundary of Lakela's 1980 "Trees of Central Florida"), northward into Georgia and Alabama without a definite boundary being specified. This indefinite coverage of Georgia should pose no problem when using the book on the outer coastal plain, but there will be the temptation to use this excellent book well north into Georgia.

Virtually every species covered has a half dozen excellent line drawings. In the oaks, where nature provides ample variation, there are enough examples of leaves to make identification almost certain. Most species have illustrations of the leaf, twig or stem, inflorescence, individual flower and fruit. Many plates even feature an inset of a 10-X view of the upper and lower side to show leaf hairs! The treatment of the conifers is magnificent and follows in the style of Sudworth's classic, "Forest Trees of the

Pacific Slope," the only book I am aware of that can approach the quality of this volume.

The text is as good as the illustrations. Mr. Godfrey has written original keys and descriptions so that the trap of many guides is avoided by having a new approach to the species. Virtually all of the keys work with vegetative material, so we are not bound to the short period of flowering to identify our specimen. Plants are arranged alphabetically within the groupings of gymnosperms and angiosperms, with monocots before dicots. There are some exceptions in the arrangement which help in making comparisons.

The descriptions are exceptionally thorough, and the glossary will be much used, unless the reader is familiar with technical terms. Habitat is stressed and also contrasted with that of similar species when helpful. Distribution information is somewhat sparse for so excellent a book. No maps or county data are supplied, yet the entire range of the species is given and is not limited to the area of the guide, so that a local atlas will be helpful.

Most interesting is the inclusion of the National Champion Big Tree for the

species. We can tell just how large the tree or shrub at hand can become in good circumstances. This, most often, is far, far larger than the specimen we see.—*L. Scott Ranger*

Addenda

Memories of Leonard Foote

Vol. 4(2): 14-18, Fall 1989 issue of *Tipularia* is a tribute to Leonard E. Foote, 1918-1989, written by Donald W. Pfitzer. Len and I were classmates at U. Conn, fraternity brothers and roommates. Thus I knew Len well and had great respect for him, but didn't know his accomplishments were so extensive even though we kept in touch on a yearly basis through correspondence.

I am requesting permission to send copies of Len's statement by Pfitzer to both the University of New Hampshire and the University of Connecticut Alumni Associations.... The article is so thoroughly researched and so well written I am going to request that each association write more than the usual obituary.—*Walter M. Collins; Durham, N.H.*



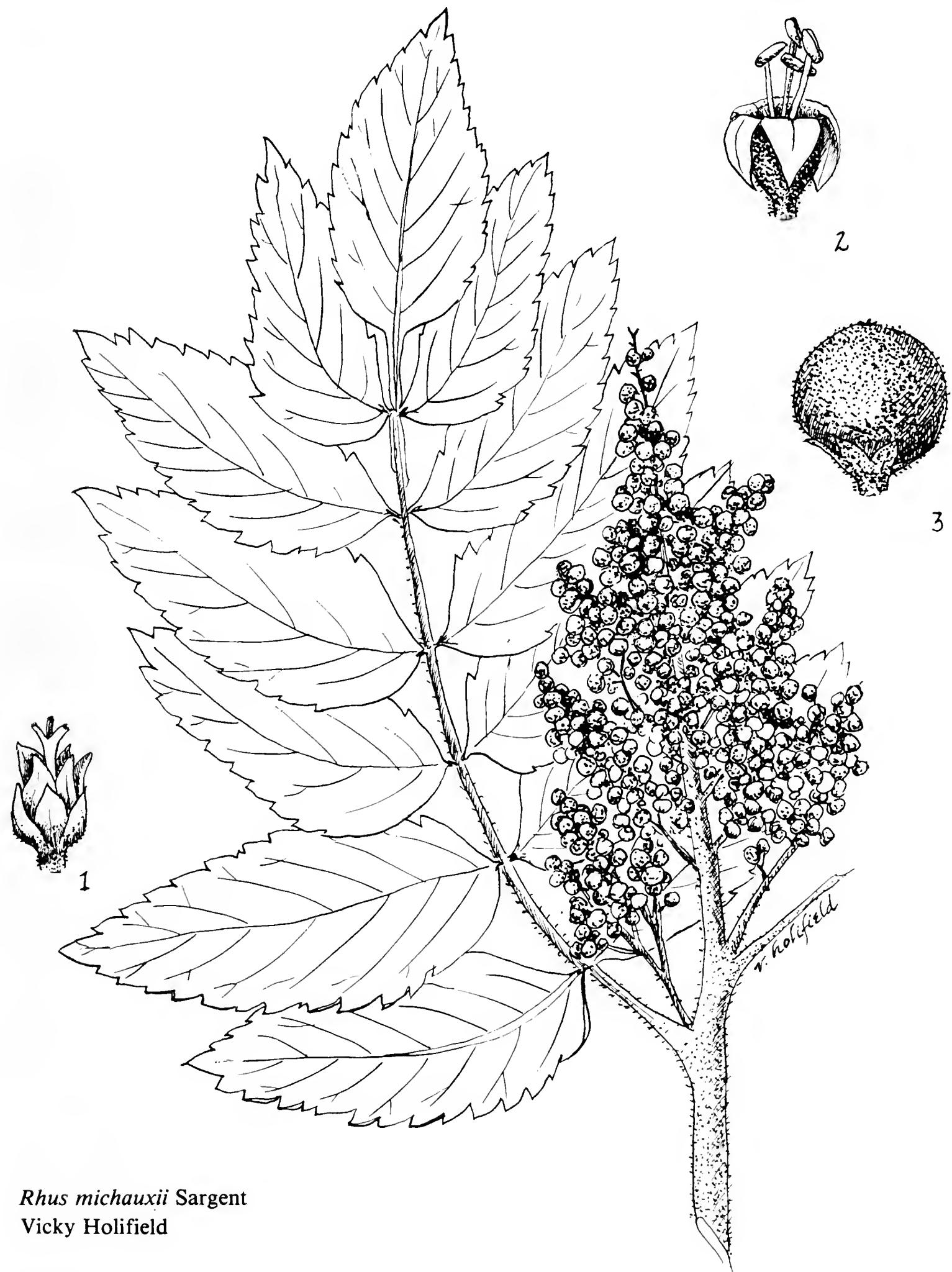
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Tipularia

A BOTANICAL MAGAZINE

Published by the Georgia Botanical Society

Fall 1990



Rhus michauxii Sargent
Vicky Holifield

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BYLINERS

Kay Kirkman, University of Georgia doctoral student in botany, and L. Katherine Kirkman, coauthor with Claud L. Brown of the new book "Trees of Georgia and Adjacent States," are the same person. Kay is conducting research at the Savannah River Ecology Laboratory on the effects of natural and man-made disturbances on vegetation of Carolina bays. **Jean Coleman**, who illustrates Kay's article, is also at the lab.

Andrew C. Kemp, an instructor in earth sciences at Shorter College in Rome, is a new member of *Tipularia*'s Board of Editors. Andy has a B.S. in natural science from Shorter and an M.S. in biology from Emory University. He has been piling up honors ever since he was 1978 valedictorian at Etowah High.

Vicky Holifield, the cover artist and illustrator for some of the articles in this issue, is a frequent contributor, as is **Bill Close**, who has done botanical drawings as well as sketches for *Tipularia*.

With this issue, **Harriett Whipple** expands Research Report into The Botany File, a more comprehensive survey of important developments related to Georgia's native plants. Research reports will continue to be the cornerstone of this regular feature.

Jonathan Streich of the Nature Conservancy's Georgia office wrote some of the *Rhus michauxii* article and frequent contributor **Thomas S. Patrick** of the Georgia Natural Heritage Inventory some of it. They argued out their differences.

Nancy C. Coile, assistant professor of biology at North Georgia College, Dahlonega, took on two roles this issue — author and review editor. She also recommended Kay Kirkman to us.

Wayne R. Faircloth, head of the biology department at Valdosta State College, also served as a review editor this issue. Wayne is one of the best editors we've ever known — and we've known quite a few.

Linda Renshaw is managing editor of *South Carolina Wildlife*, a magazine that is great to read and marvelous to look at.

George A. Rogers, professor emeritus of history at Georgia Southern, wrote about *Franklinia* in *Tipularia*'s inaugural issue.

Frequent contributors **David Emory**, **Marie Mellinger**, and **Scott Ranger** are back, interesting as usual. Retired *Tipularia* editor **Anna Belle Close** was a great help.

Margaret Shannon has a plaque hanging on the wall above her word processor that identifies her as founding editor of *Tipularia*.

Big news last. Starting next issue, **Ginger Kaderabek** of Decatur, writer and editor for in-house publications at Georgia Power Company, becomes *Tipularia*'s third editor. Ginger, a Vanderbilt graduate in English and biology, is working on a Ph.D. in English literature at Georgia State. She has been a student publications adviser at Emory and a staffer at TV Guide, the Southside Sun, and the Journal-Constitution — *M. S.*

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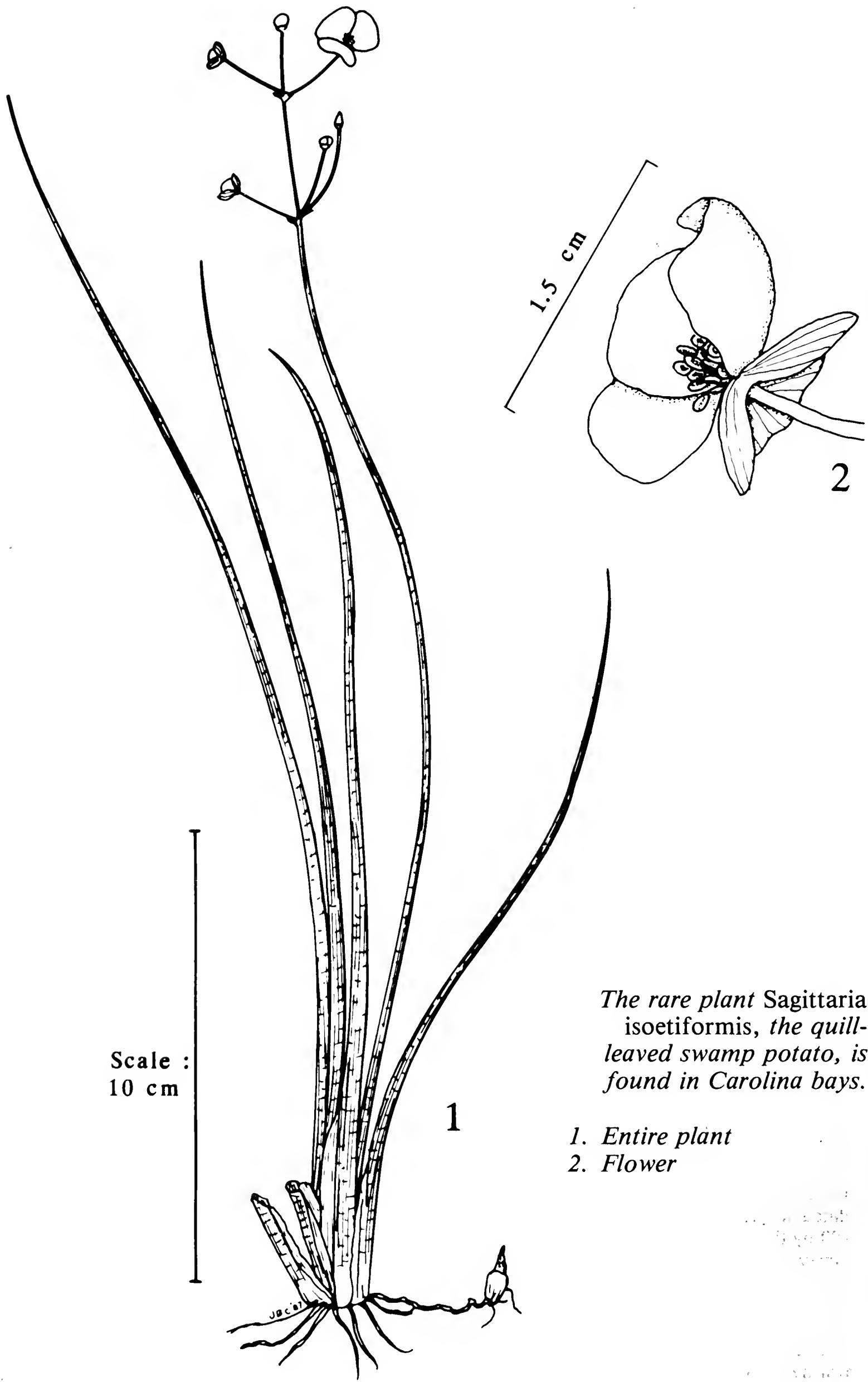
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Artists: Bill Close, Jean Coleman, Vicky Holifield

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Cover: *Rhus michauxii*, Michaux's sumac, or false poison sumac.
1. Pistillate flower.
2. Staminate flower. 3. Fruit.



The enduring enigma of Carolina bays

The origin of these wetlands is unknown, their orientation a puzzle, and even the number disputed

By Kay Kirkman
Illustrated by Jean Coleman

Carolina bays are isolated fresh-water wetlands which are unique to the Coastal Plain of the southeastern United States, extending from Maryland to Florida and west to Alabama. These shallow geomorphic formations are distinguished from other fresh-water wetlands in two particulars: an elliptical-to-ovoid shape and the typical northwest-southeast orientation of the long axis.

Because of this consistent orientation, Carolina bays appear approximately parallel to one another across a landscape—a puzzling phenomenon that became conspicuously evident with the availability of aerial photography. The bays also frequently have a sandy rim that is most prominent along the southeastern edge.

The origin of Carolina bays remains an unsolved puzzle. There are numerous theories (Sharitz and Gibbons, 1982; Savage, 1982). Some are fanciful, some less so.

Two of the more outlandish explanations are that the depression pools were

caused by large schools of spawning fish or large sea creatures or that they are ancient launch sites for extraterrestrial spacecraft.

The most sensationalized and controversial, however, is the theory of meteoritic showers (Melton and Schriever, 1933; Prouty, 1952), but to date no meteor fragments have been found that might be responsible for forming these bays. Another explanation attributes the bays to dissolution of substrate minerals (Smith, 1931).

The theory that is probably given most credence (Kaczorowski, 1977) suggests that the depressions were initially created by such natural forces as coastal, fluvial, eolian, or solutioning processes and that their shape and orientation were developed by winds.

There is dispute, too, over their age. Carolina bays are restricted to sandy soil regions of the Coastal Plain, but they are positioned on several different geological formations (Prouty, 1952; Gamble *et al.*, 1977). This has given rise to age estimates that start as low as 10,000 years and range as high as 250,000 years (Wells and Boyce, 1953; Gamble *et al.*, 1977).

Experts do not even agree on how many Carolina bays there are. Charles Wharton has cited an estimate of 1,000 in Georgia (1978). An intensive survey in South Carolina located only 200 that have escaped human alteration (Bennett and Nelson, draft report). Maryland has an estimated 1,500 to 2,000 (Tyndall *et al.*, 1990).

These are relatively modest figures when compared with a 1952 estimate by W. F. Prouty that there were a total of nearly 140,000 Carolina bays of greater than 500 feet in length and hundreds of thousands of smaller ones. Now a draft report on the status of Carolina bays in South Carolina suggests that they are actually much less common than that. Its authors, S. H. Bennett and J. B. Nelson, indicate that Prouty's estimate is inaccurate by at least two orders of magnitude. This would make the total number of bays drastically lower: just 1,400 Carolina bays of greater than 500 feet in length and thousands, instead of hundreds of thousands, of smaller ones.

One difficulty in determining more or less accurate totals is that the boundaries of these wetlands often have been obscured by agriculture or other development. Another difficulty is that not many people have gone counting. Georgia, for instance, has had no inventory such as that in South Carolina (J. Ambrose, pers. comm.). Better

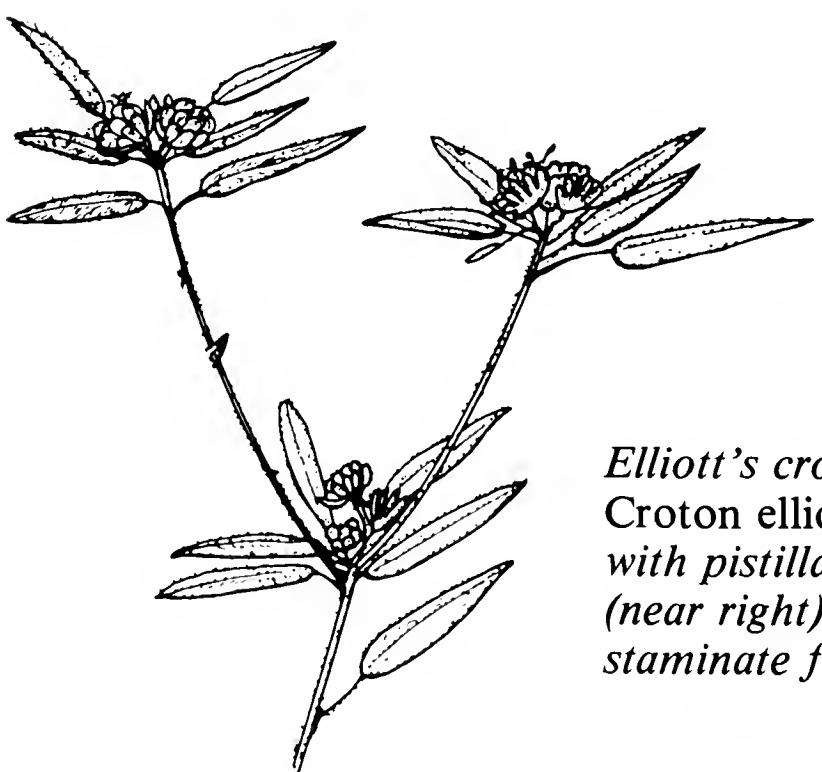
estimates require better data than presently available.

Carolina bays vary greatly in size, ranging from 50 meters (1,968 feet) to 8 kilometers (5 miles) in length (Sharitz and Gibbons, 1982). Some bays overlap, forming multiple- or heart-shaped depressions. A bay in Georgia which has received considerable attention, Big Dukes Pond in Jenkins County, covers 1,200 acres.

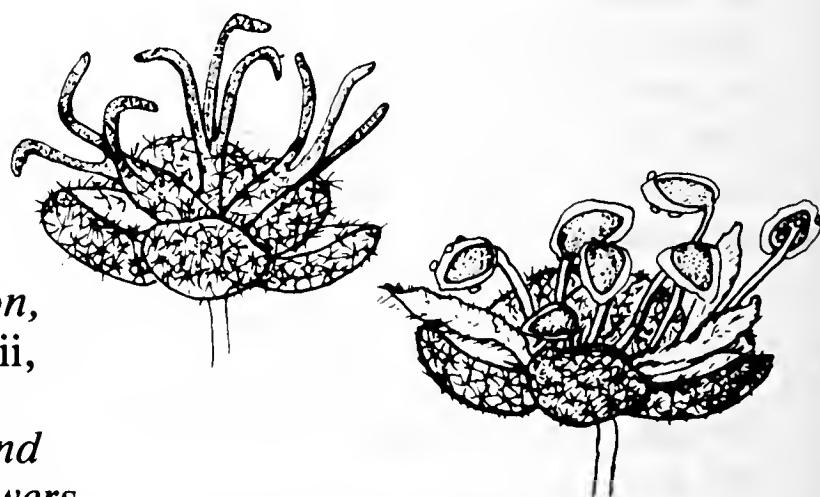
Big Dukes is the largest and the most northern wood stork nesting colony in the state. In one of the few steps that have been initiated in Georgia to acquire and protect these isolated freshwater wetlands, a part of Big Dukes is now in the hands of the Nature Conservancy—a gift from Kimberly-Clark Corporation. The rest, including the wood stork rookery itself, remains under private ownership (J. Streich, pers. comm.).

Not only do Carolina bays vary in size, but the northwest-southeast orientation sometimes varies also (Kaczorowski, 1977). In the northern range, the bays tend to be randomly oriented; in the southern range, there is a more north-south orientation. Only in the central range—North Carolina and South Carolina—is the typical northwest-southeast orientation rather consistent, varying only 10 to 15 degrees.

Much confusion exists in the use of wetlands terms such as "Carolina bay,"



*Elliott's croton,
Croton ellottii,
with pistillate
(near right) and
stamineate flowers*



“pocosin,” “shrub bog,” and “bay head.” They share many species of plants and various other characteristics.

“Pocosin” specifically refers to ecosystems which have highly organic soils and are characterized by broad-leaved evergreen shrubs or low trees. “Shrub bog” is a general term referring to southeastern wetlands with restricted drainage and a dominance of broad-leaved evergreen shrub vegetation. Although Carolina bays may have similar vegetation, their unique elliptical-to-ovoid shape makes them distinct.

The term “bay” itself simply adds to the confusion. Carolina bays do not fall within the term’s primary basic definition as a body of water forming an indentation of the shoreline. Then, the term “bay” is widely used in botany as a descriptor of the bay species—for example, *Persea*, *Gordonia*, *Magnolia*. “Bay,” “bay gall,” and “bay land” are often used to refer to swamps containing this vegetation (Richardson and Gibson, in press). “Bay forests” is a term that has been applied to a sub-category of pocosin-type vegetation by botanists in North Carolina and South Carolina (Bennett and Nelson, draft report).

Fluctuating water levels are characteristic of Carolina bays, which typically have no tributary system connections. In periods of high rainfall, they are essentially lakes. In times of drought or high evapotranspiration, they become simply dry depressions. A few—not many—are known to be spring-fed, year-round lakes.

The nature of the soil in Carolina bays is intimately linked with the fluctuating hydrologic conditions and the vegetation. South Carolina’s Heritage Trust has distinguished two major groups of bays based on soil types: (1) those with deep peat—often several meters deep—overlying a humate-sand layer and (2) those with shallow mineral soils over a clay lens that impedes water

drainage. Bays may be open water or even have upland vegetation.

Most bays in North Carolina are the deep-peat type, the majority in South Carolina clay-based. The peat bays found in South Carolina are in the lower Coastal Plain (Bennett and Nelson, draft report).

As a consequence of erratic environmental conditions, vegetation and fauna supported by Carolina bays are adapted to fluctuating water levels and corresponding temperature and nutrient changes, and there is no particular type of vegetation that is exclusively restricted to, or characteristic of, the bays.

Instead, they have plant communities as diverse as grass-sedge marshes, cypress ponds, forested or shrubby pocosins, or strictly aquatic systems. Representative plant species associated with some of these communities are described below.

Nonalluvial swamp (mixed hardwood swamp)

Representative plants:
Swamp black oak, *Nyssa sylvatica* var. *biflora*

Red maple, *Acer rubrum*

Water oak, *Quercus nigra*

Sweetgum, *Liquidambar styraciflua*

Pond cypress, *Taxodium ascendens*

The presence of red maple and sweetgum appears often to be associated with altered hydrologic regimes, especially with little or no standing water in dry seasons.

Pond cypress pond (cypress-gum)

Trees:

Pond cypress (dominant)

Swamp black gum (may be codominant)
Mixed hardwoods as in previous category (often present)

Herbaceous species:

Bladderworts, *Utricularia* spp.

Cinnamon fern, *Osmunda cinnamomea*

Pickerelweed, *Pontederia cordata*

Several sedges, *Cyperus* spp., *Rhynchospora* spp.

Usually these bays are dry only during drought periods. When they are drained, hardwood species become more abundant.

Depression meadows (grass sedge marsh, graminoid wetlands)

Representative species:

Cutgrass, *Leersia hexandra*
Maidencane, *Panicum hemitomon*
Beakrushes, *Rhynchospora* spp.
Sundews, *Drosera* spp.
Nut rush, *Scleria reticularis*
Bald rush, *Psilocarya nitens*
Cyperus, *Cyperus* spp.
Pipeworts, *Eriocaulon* spp.
Bog-buttons, *Lachnocaulon* spp.
Meadow beauty, *Rhexia virginica* and
R. mariana
Redroot, *Lachnanthes caroliniana*
Bladderworts, *Utricularia* spp.
Yellow-eyed grass, *Xyris* spp.
Rattleboxes, *Ludwigia* spp.
Polygalas, *Polygala* spp.

The absence of woody species in this community is perplexing, and the role of fire in perpetuating this condition is unknown. Some herbaceous Carolina bays on the Savannah River Site, Aiken, South Carolina, that have been deliberately protected from fire for 40 years remain herbaceous today (Kirkman *et al.*, 1989; Schalles *et al.*, 1989).

Pocosins

Representative species:

Pond pine, *Pinus serotina*
Loblolly bay, *Gordonia lasianthus*
Sweet bay, *Magnolia virginiana*
Red bay, *Persea borbonia*
Gallberry, *Ilex coriacea*
Inkberry, *Ilex glabra*
Titi, *Cyrilla racemiflora*
Fetterbush, *Lyonia lucida*

Pocosins can be quite variable, and pocosin-type vegetation has been subdivided into high pocosins, low pocosins, bay forests, pond pine woodlands, and so on, depending on the height of the vegetation and the

dominant species present. The period of soil saturation and the depth of the peat appear to be controlling factors in the establishment and growth of the vegetation (Otte, 1981). Fire is common, occurring as often as every six to ten years.

These complex and mystifying ecosystems harbor a large number of rare plants and animals. One such plant is Canby's cowbane, *Oxypolis canbyi* (Coulter and Rose) Fernald, which is on the federal list of endangered species.

Other rare plants that occur in Carolina bays are:

Awn-petaled meadow beauty, *Rhexia aristosa*
Little bur-head, *Echinodorus parvulus*
Quill-leaf, *Sagittaria isoetiformis*
Spoonflower, *Peltandra sagittifolia*
Sarvis-holly, *Ilex amelanchier*
Boykin's lobelia, *Lobelia boykinii*
Rose coreopsis, *Coreopsis rosea*
Spike-rush, *Eleocharis robbinsii*
Venus fly trap, *Dionaea muscipula*
White wicky, *Kalmia cuneata*
Creeping seedbox, *Ludwigia spathulata*

Obtaining information about Carolina bays in Georgia is critical if these valuable and diminishing wetlands are to be protected before they disappear, Jonathan Streich of the Nature Conservancy warns. Major efforts are underway in North Carolina and South Carolina to purchase and protect Carolina bays, and some activity along this line has begun in Georgia, including the previously mentioned acquisition of part of Big Dukes Pond by the Conservancy.

Much research remains to be done into the biological and physical complexities of Carolina bays and into the question of how—and how much—they should be managed. Information is critical to keeping these valuable and diminishing wetlands from harm's way.

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*The awned meadow-beauty,
Rhexia aristosa,
has purple petals*

1. *Hypanthium*
2. *Leaves (upper
and lower views)*

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*This drawing appeared in 1859,
two years after the discovery
of *Neviusia alabamensis**



Alabama snow wreath in Georgia

*The rare shrub
Neviusia alabamensis
grows in the Pocket*

By Nancy C. Coile
Illustrated by Vicky Holifield

On an extremely hot day in July 1987, Steven M. Bowling led my husband, Robert J. Coile, and me to Pigeon Mountain to see a rare shrub with a common name that defied the temperature, the Alabama snow wreath, *Neviusia alabamensis*.

Steve, the one-time boy-wonder botanist who is still a wonder, but an older one, had found this population, the first ever reported in Georgia, at 1,500 feet elevation on thin soil over limestone along Waterfall Branch on an east-facing slope of Pigeon, in Walker County.

This day, Waterfall Branch was completely dry, as were our mouths. We were covered with perspiration. The infamous drought period that the area was going through also had the vegetation drooping.

We located two colonies of *Neviusia*. The larger patch was about 10 by 15 feet. The smaller colony was some 150 feet downhill, seated on a limestone boulder. Oddly, these colonies were in a wooded situation. The larger was adjacent to the dry bed of Waterfall Branch and was less shaded than the other one.

The plants were in fruit. Herbarium specimens (N. C. Coile 4735, with S. M. Bowling and R. J. Coile) were taken to document the presence of Alabama snow wreath in Georgia. A voucher has been deposited in the University of Georgia herbarium.

Neviusia alabamensis Asa Gray is a member of the rose family (Rosaceae). It is the only species in the genus, and thus is a monotypic genus. The flowers lack petals, but the stamens are white and eye-catching. The plants are prized for cultivation.

The snow wreath is a deciduous shrub less than six feet tall, with numerous arching branches. The bark of the stem peels and shreds in a manner similar to ninebark, *Physocarpus opulifolius* (Linnaeus) Maximowicz. Leaves are borne alternately, have doubly serrated edges, and give the appearance of spirea leaves. The plant has a colonial pattern of dense thickets.

In "Native Shrubs and Woody Vines of the Southeast," Leonard E. Foote and Samuel B. Jones Jr. suggest that *Neviusia* is a "great plant to challenge your friends to identify." Except when flowering, it is not very noticeable and well may be overlooked. When the shrub is closely examined, however, the presence of persistent, dry fruits indicates that this is not one of our commonplace shrubs. (Plate 18 in the Foote-Jones book has an excellent photograph of the plant in flower.)

Alabama snow wreath — so called because of its spirea-like flowers — was first discovered in 1857 by the Rev. R. D. Nevius of Tuscaloosa, Alabama. A specimen was sent to Asa Gray, and in 1859 Gray described it in the American Academy of Arts and Sciences journal and named the plant for its finder. The minister had wished to name it for a geologist friend, but Gray found that that name was already in use and so had honored Nevius, Latinizing his name in "an unclassical...manner."

The plant was "detected" — that's Gray's word — in the spring of 1857, on

cliffs along the Black Warrior River in the vicinity of Tuscaloosa. "The...plant — a shrub with the habit of *Spirea* — was at once seen to be a new type," Gray wrote. "As the discovery of a shrub of a new genus within the United States is an uncommon event, I take this opportunity to indicate its characters and affinities." One of the affinities he noted was to *Kerria*, a shrub of Japanese origin.

Writing in *Castanea* in 1989, Alice A. Long listed a total of 15 counties in Alabama, Arkansas, Georgia, Mississippi, Missouri, and Tennessee where *Neviusia* had been found. She also reported that only 13 of the counties now have extant populations. It has vanished in Missouri. Plants have been found in limestone, sandstone, or shale soils (Horn and Somer, 1981).

Georgia's only known site, the one in Walker County on Pigeon Mountain, is near a cove called the Pocket. Pigeon is a flat-topped mountain composed of layers of sandstone, limestone, chert, and shale. The well-known Lookout Mountain adjoining to the west was formed during the same geological periods through the same processes. Both mountains are part of the Cumberland Plateau.

Streams have eroded into sandstone caps on Pigeon Mountain, forming valleys and coves which support a rich flora. The Pocket, on Pigeon Mountain's west side, is one of the richest of these — just possibly the richest.

Much of the mountain is a Wildlife Management Area owned by the Georgia Department of Natural Resources (DNR). Because the spot where the *Neviusia* population occurs is in the Management Area, the Georgia population may be safe.

Since the species is used in cultivation, the native populations there and elsewhere could be in danger from unscrupulous collectors, however. For that reason and others, *Neviusia alabamensis* has been proposed for addition to the federal list of endangered

species. It is now under review, according to Charles V. ("Chuck") Rabolli, of DNR's Natural Heritage Inventory.

In 1989, almost two years after my visit there with Steve and my husband, Thomas S. Patrick, botanist with the Heritage Inventory, accompanied the Georgia chapter of the Nature Conservancy on a spring field trip to Pigeon Mountain. The group moved up the mountain from the base of Waterfall Branch. Near the base they found a single *Neviusia* plant that probably had been washed downstream.

Why is the Alabama snow wreath so infrequent? It does well in cultivation, yet natural populations are limited. Apparently the seeds are not a good method of propagation; cultivated plants come from cuttings.

The extant natural colonies are sparse and widely spread out, from Arkansas to Georgia. Was *Neviusia* once abundant? If so, what factors cause its present restricted growth? There are no documented answers to these questions.

You are challenged to ferret out new Georgia locations. Lookout Mountain might be a good place to be on the lookout.

ACKNOWLEDGMENTS

The following are thanked: Steven M. Bowling for his willingness to share his rare find; Thomas S. Patrick for providing the illustration of *Neviusia*; Georgia Natural Heritage Inventory for information; Beacham Furse for editorial comments.

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*Pycnanthemum
curvipes,
the Tennessee
mountain mint*



Those picky *Pycnanthemums*

*What is Tennessee
mountain mint? Here's
the answer (maybe)*

By L. Scott Ranger
Illustrated by Vicky Holifield

Few things in life prove simple. This is the tale of how an obscure mention of a plant led me on a convoluted path to find out just what the plant is and to a confirmation of my belief that scientific names aren't as specific as many people would make them out to be.

This tale starts with the management plan for the 2,884-acre Kennesaw

Mountain National Battlefield Park at Marietta, Georgia. The plan mentions two plants as of special concern to the U.S. Fish and Wildlife Service: bay star-vine and Tennessee mountain mint.

Bay star-vine, or wild sarsaparilla, is *Schisandra coccinea*, which is a protected plant in Georgia. It grows along the Chattahoochee River, but not in Kennesaw Park. The park management plan carried no binomial for Tennessee mountain mint, and the vernacular

Comparative treatments of *Pycnanthemum*

Grant-Epling (2)	Fernald (1)	Radford (3)	Wofford (4)
<i>P. incanum</i>	<i>P. incanum</i>	<i>P. incanum</i>	<i>P. incanum</i>
<i>P. loomisii</i>	<i>P. incanum</i> var. <i>loomisii</i>	<i>P. incanum</i>	<i>P. pycnanthemooides</i> var. <i>pycnanthemooides</i>
<i>P. puberulum</i>	<i>P. incanum</i>	<i>P. incanum</i>	<i>P. pycnanthemooides</i> var. <i>pycnanthemooides</i>
<i>P. tullia</i>	<i>P. puberulum</i>	<i>P. incanum</i>	<i>P. pycnanthemooides</i> var. <i>pycnanthemooides</i>
<i>P. viridifolium</i>	<i>P. pycnanthemooides</i>	<i>P. incanum</i>	<i>P. pycnanthemooides</i> var. <i>pycnanthemooides</i>
	var. <i>viridifolium</i>		var. <i>viridifolium</i>
<i>P. albescens</i>	<i>P. albescens</i>	(?)	(?)
<i>P. curvipes</i>		(?)	<i>P. curvipes</i>
<i>P. floridanum</i>	(Not found in area)	(Not found in area)	(Not found in area)

- (1) Fernald, Merritt Lyndon. 1950. Gray's manual of botany, eighth edition. American Book Company, New York.
- (2) Grant, Adele and Carl Epling. 1943. A study of *Pycnanthemum*. University of California publications in botany, vol. 20, no. 3. University of California Press, Berkeley.
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name was not in any source I checked. So I had a mystery on my hands. What could it be?

It seemed safe to assume that this mint is in the genus *Pycnanthemum* along with the "ordinary" mountain mint, *P. incanum*, which seemed to grow all over Kennesaw Mountain. The clues that I followed eventually led me to believe that the park's Tennessee mountain mint is *Pycnanthemum curvipes*. It was quite a search.

Before the first federal list of endangered and threatened plants was made, the Smithsonian Institution and the World Wildlife Fund compiled a preliminary list for every state. The Georgia list includes *Pycnanthemum curvipes* unadorned with a common name.

P. curvipes was not listed in the botanical manuals for this area that I checked. A literature search was the next step, and in due course I found it in "A Study of *Pycnanthemum*" (1943) by Adele Grant and Carl Epling. They recognize *P. curvipes*, as originally described by Edward Lee Greene, as a distinct species and note it as occurring in Davidson and Polk Counties, Tennessee, and DeKalb and Fannin Counties, Georgia, as well as in Alabama and North Carolina. Its occurrence in Tennessee at least took care of the question of where it got its common name.

Solving other aspects of the mystery is not so simple, however. It was obvious, as my search of manuals showed, that *Pycnanthemum* species are not interpreted the same way by every author. Confusion sets in, and reconciling the differences looks like a hopeless task. Coauthor Harry E. Ahles observes in "A Manual of the Vascular Flora of the Carolinas" (1968) that *Pycnanthemum* is a genus "in much need of careful study." I couldn't agree more.

Often a comparison of varying treatments will lead the way out of such a bewildering maze of seemingly unconnected scientific names. Different ways

that the species within the genus are sliced up may become apparent. The accompanying chart "Comparative Treatments of *Pycnanthemum*" (see page 12) serves such a purpose for Tennessee mountain mint.

The chart makes it immediately clear that what Grant and Epling conceive as a cluster of related, but significantly different species is interpreted by Ahles as one large and variable species. M. L Fernald, in "Gray's Manual of Botany" (1950), is somewhere in the middle. The dates show the earlier interpretation (Grant and Epling in 1943) was to split, followed by moderate lumping (Fernald, 1950) and severe lumping (Ahles, 1968).

B. Eugene Wofford, in the recently published "Guide to the Vascular Plants of the Blue Ridge" (1989), returns to a narrow view of species, but his interpretation is not quite the same as either Grant and Epling or Fernald.

"The Distribution of the Vascular Flora of Georgia," the atlas released by the University of Georgia in 1988, employs most of the names found in Grant and Epling, but this may reflect the herbarium specimens that it was compiled from and the different manuals and keys used to identify the specimens.

Where does this leave the Tennessee mountain mint? Is *P. curvipes* a distinct species or not? The answer is not clear. The next place to look is the keys and descriptions of different authors.

For instance, to separate *P. curvipes* from *P. incanum* Grant and Epling use a major couplet based upon bristles:

—"Calyx teeth and bracts without long jointed bristles." (This leads to *P. curvipes*.)

—"Calyx teeth and bracts usually tipped with long jointed bristles or the latter pectinate (comb-like)." (This leads to *P. incanum* in the narrow sense.)

Wofford chooses another character, symmetry of the calyx, to distinguish

between the two species. His couplet is as follows:

—“Calyx nearly regular, the teeth of essentially uniform length.” (This leads to *P. curvipes*.)

—“Calyx bilabiate, the upper tooth about $\frac{1}{2}$ or less the length of the lower teeth.” (This leads to *P. incanum* in the narrow sense.)

Both of these key constructions give the clear impression that *P. curvipes* and *P. incanum* in the narrow sense are distinct species and are, in fact, readily separated. If the two characters are combined—regular calyx without bristles versus labiate calyx with bristles—a definite field identification can be made.

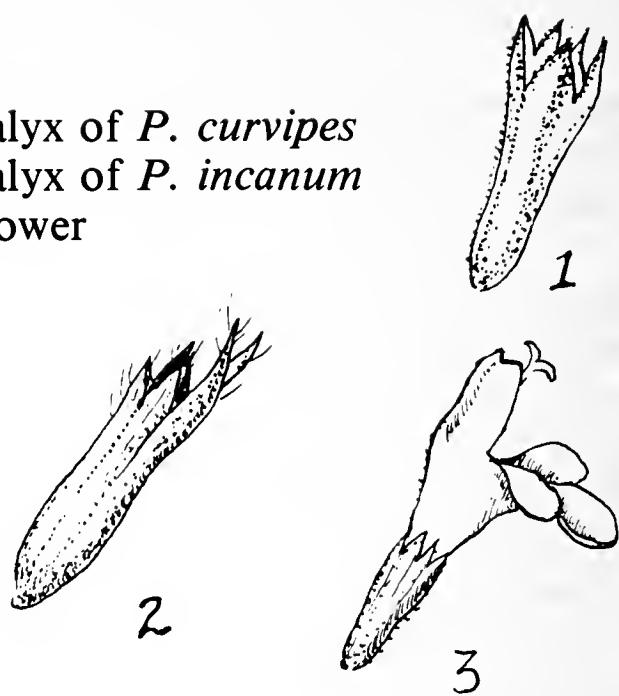
An examination of *Pycnanthemum* material in the University of Georgia herbarium seemed to confirm my suspicion that many of the identifications were made using the Ahles treatment in “Manual of the Vascular Flora of the Carolinas” as a guide, especially those after 1968, the year of its publication.

Before that, names follow the narrower species concept, with the result that the university atlas, using actual herbarium specimens, shows *Pycnanthemum incanum* as widely distributed in Georgia. When Grant and Epling’s key is used, however, herbarium material from northwest Georgia, apart from the Blue Ridge, is shown to be *Pycnanthemum curvipes*, even though it is labeled *P. incanum*.

Another way to help understand what is going on is to make a careful study of the geographic distribution of species in Georgia. Space limitations here must postpone a detailed discussion of this and, therefore, of questions that these preliminary and limited observations raise about distribution patterns shown in the university atlas.

Before leaving the subject, however, here is one example: There is material in the university herbarium from Cobb County that is labeled *Pycnanthemum incanum* or *Pycnanthemum albescens*

1. Calyx of *P. curvipes*
2. Calyx of *P. incanum*
3. Flower



that is clearly *Pycnanthemum curvipes*. The same critical examination of herbarium specimens from other counties would be required to resolve the overall situation in the state.

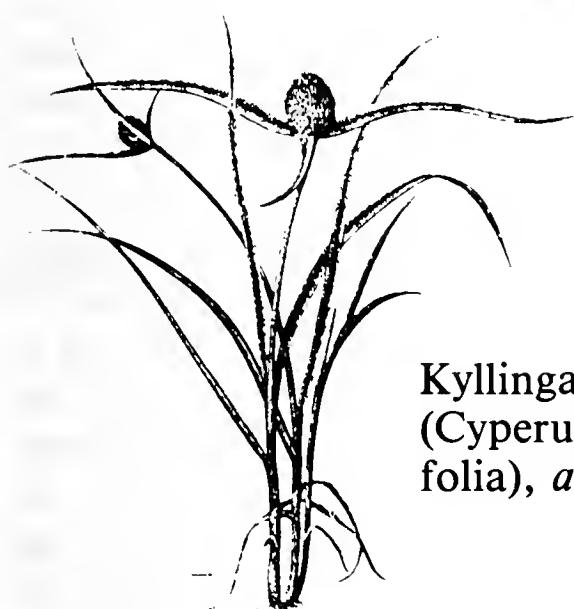
My convoluted quest to solve the mystery of the Tennessee mountain mint in Kennesaw Mountain National Battlefield Park has led me to *Pycnanthemum curvipes* and to persuasive evidence that it is a valid species. Only a critical systematic investigation of the genus *Pycnanthemum*, including meticulous field study, will confirm that.

What I learned in my quest now leads me to repudiate my statement near the outset of this article that the “ordinary” mountain mint, *P. incanum*, grows all over Kennesaw Mountain. With Grant and Epling or Wofford as guides, the Tennessee mountain mint, *P. curvipes*, is shown to be the abundant mountain mint there. In fact, it is the most common member of the mint family (Lamiaceae) in the park.

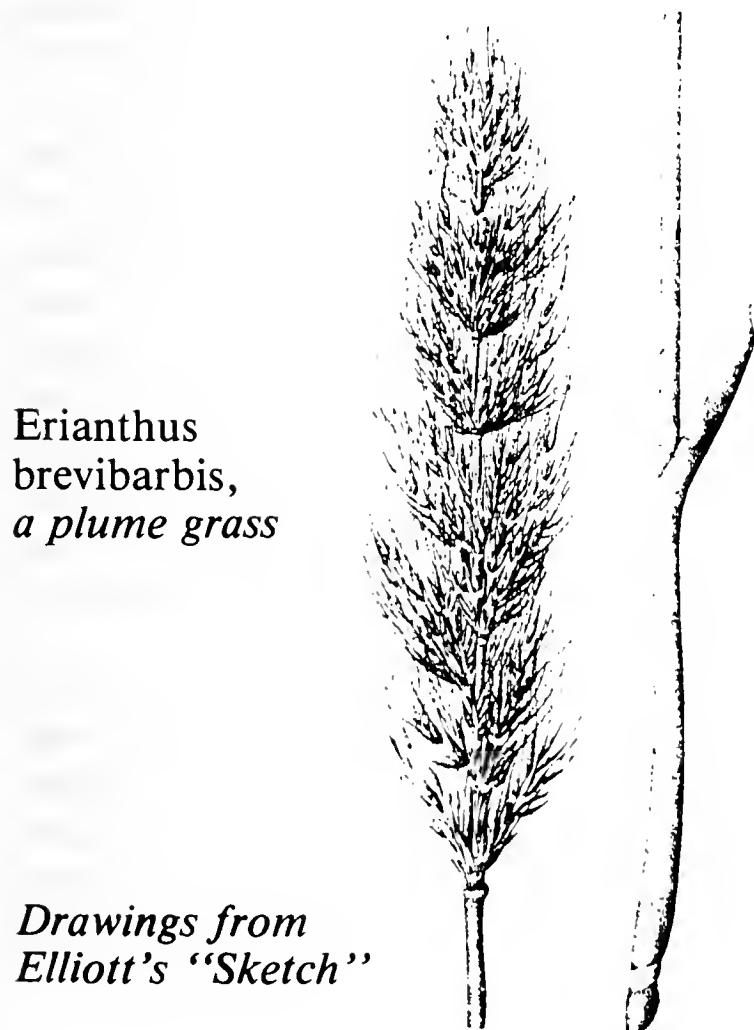
Is it a threatened or endangered species? Not there, for it thrives on neglect in poor, rocky soil and happily survives the weed-whacking administered along the roadsides by the maintenance people. Determining the status and range of *P. curvipes* elsewhere in Georgia will not be easy in the light of the possibly widespread misidentification of the species in the past. The task is there for the taking.



*Fuirena squarrosa,
an umbrella grass*



*Kyllinga pumila
(Cyperus tenuifolia), a sedge*



*Erianthus
brevibarbis,
a plume grass*

*Drawings from
Elliott's "Sketch"*

The botanizing banker's Georgia journey

*In 1818, Stephen Elliott
crossed the state,
collecting as he went*

By George A. Rogers

With the price of cotton rising and ceded Creek Indian lands in Alabama selling for two dollars an acre, 50 cents down and the rest on credit, Stephen Elliott and seven partners on July 20, 1818, formed a company to get in on the action. Elliott was designated as agent for the company. Rather hurriedly thereafter, "in the commencement of August," he left Charleston, South Carolina, for Cahaba, Alabama, to buy some of the four million acres available from the federal government.

Elliott was a banker, 37 years old at the time, a graduate of Yale, a planter, a legislator, and a dabbler in natural history as a collector of plants, minerals, sea shells, and insects. In time he acquired a magnificent private library of some 2,500 volumes of history, literature, and natural history.

Elliott's interest in botany had deepened through the years and had led by 1818 to publication of the first five numbers, or segments, of "A Sketch of the Botany of South-Carolina and Georgia." As the separate numbers were printed, he sought to arrange their

sale through his network of collector-correspondents scattered about the country.

Among these were Dr. Thomas J. Wray of Augusta and Dr. Samuel Boykin of Milledgeville. The journey would allow him to visit them. He also expected to find new and interesting plants along his route.

Wray, a pharmacist, also was an enthusiastic botanist and horticulturist who maintained an extensive garden with many native plants. Boykin furnished many plant specimens to Elliott and later to the well-known botanists John Torrey and Asa Gray. Boykin also found time from his busy medical practice to act as a book agent for Elliott.

Somewhere near Milledgeville, Elliott collected a plant he listed as *Lindernia refracta* E. (*), a false pimpernel. His use of his initial following a binomial

indicated what he thought, often mistakenly, was discovery of a new species. In this instance, he had already published some comments on *L. refracta* two years earlier based on specimens he had collected in Burke County, Georgia, and in South Carolina.

Around Milledgeville Elliott also began to see *Hydrangea quercifolia*, the oak-leaf hydrangea, which William Bartram described and illustrated in his "Travels." Bartram had discovered the species 43 years earlier somewhat to the west, in what is now Crawford County, Georgia.

The Charleston banker's route generally followed Bartram's in 1775 along "the great trading path from Augusta to the Creek Nation." More recently, the Federal Road had been established from Milledgeville westward, and Elliott took it.

He passed Fort Hawkins, the future site of Macon, and continued to the Indian agency on the Flint River and to the "national establishment on the Chatahouchie (Chattahoochee) River" near the future site of Columbus. He crossed over into Alabama there, passed the site of Montgomery, and some 50 miles west of there arrived at Cahaba, which was located at the confluence of the Alabama and Cahaba Rivers.

After tending to the business of the journey, Elliott headed back to Charleston retracing his route at least as far as middle Georgia. He did not return through Augusta, so he probably turned toward Louisville somewhere between Fort Hawkins and Milledgeville to take the Louisville-Savannah Road. He estimated that he had traveled in excess of 500 miles each way.

Even with the western country fast opening up, frontier still was dominant from Milledgeville to Cahaba. The heat of late summer was bearing down upon Elliott, and he was bound to be encountering conditions that were primitive compared to Charleston.





*A banknote engraving
of Stephen Elliott,
circa 1812 or 1813*

For instance, there is the description given ten years later by Mrs. Basil Hall, who left Macon on March 28, 1828, on a journey westward with her husband and family. She writes of a night at the old Indian agency on the Flint. Their accommodations were a "small wooden house" of one room. The room had big holes all around with "abundant admission both of light and air." They put up their mosquito curtain and placed a table close to the bed so they could do some writing in safety. But their protective barrier was penetrated, for she wrote: "On the last page is the blood of one (mosquito) I chanced to murder some few minutes ago."

Although Elliott's collection journal for this trip has not been found, he habitually made detailed notes for each plant collected. His descriptions on flowering and habitat for species in his

"Sketch" were based upon such notes.

Soon after leaving Milledgeville, Elliott began seeing *Cleome cuneifolia* on the dry ridges. He reported *Helianthus pubescens*, a sunflower, "around ponds near the Flint River." He collected *Scutellaria villosa* E. (*) (*S. incana*), a skullcap, and began to find the magnificent *Hypericum aureum*, the golden St. John's-wort.

He was in what long had been Creek Indian territory and soon arrived at the agency where Benjamin Hawkins had presided as superintendent of Indian affairs. Today, a stone marker shaped like a broad-headed arrow marks the site. Hawkins had died two years earlier.

Elliott was now embarked into "the country of the *Helianthus*, the *Silphium*, the *Rudbeckia*, and of...the *Solidago*." There was a rush of species



Elliott "discovered" a sunflower,
Helianthus scaberrimus (above);
took note of *Rudbeckia pinatta*



new to him, notable among them *Brickellia cordifolia* E. (*), which he named in honor of Dr. John Brickell of Savannah, a Revolutionary War surgeon, who had taught Elliott much about botany.

In the "Sketch," plants found between the Flint and Georgia's west boundary were commonly designated as "in the western district of Georgia." His bountiful harvest continued of what he thought of as new species — various asters, sunflowers, coneflowers, rosin-weeds, and goldenrods, among others. He looked everywhere. He scouted habitats ranging from "the high ridges" to "the poorest pine barrens," "the sides of hills," "around ponds," in sandhills, and along roadsides and riversides.

Having left Charleston early in August, he was botanizing near the Alabama River in early October and was back home writing to John Torrey on November 21, 1818. Some 62 species described in the "Sketch" can be correlated with his trip.

While his botanical accomplishments were substantial, the costs of the trip to him were almost devastating. His health, already precarious from the

previous winter, soon took on added adverse aspects. His and his partners' hopes for quick profits from their land speculation in Alabama faded with the financial depression of 1819. Difficulties at his bank figured in his decision not to accept the presidency of South Carolina College in Charleston in 1820, despite the desires of his wife.

He was threatened with even the loss of his little farm north of Charleston, where he kept his herbarium, grew wild plants, and wrote much of the "Sketch." He also had the idea of retracing his journey to observe and collect the flora in spring, but he never did so.

When Elliott completed the sixth number of his "Sketch," it was bound with the first five numbers as Volume I. Seven later numbers were issued between 1821 and 1824 and bound as Volume II. Elliott died in 1830 at the age of 59.

*The letter "E." as used in this article is not an attribution of a plant to the botanist who today is credited with first describing the species, as is the usual form in botanical manuals and other sources. Instead, it reflects Stephen Elliott's way of designating any species that he thought was new. The binomial followed by "E." is the one Elliott assigned to it.

Michaux's sumac comes back to Covington

A project to restore an endangered shrub to a site where it grew 30 years ago just may succeed

**By Jonathan Streich
and Thomas S. Patrick**
Illustrated by Vicky Holifield

We are increasingly aware of the alarming predicament where an endangered species may be more abundant at a zoo or in a botanical garden than in the wild. Now, in one of the first undertakings of its kind, the Nature Conservancy is involved in a woody plant restoration project in Georgia. The plant is the dwarf sumac known as Michaux's sumac, *Rhus michauxii*. This sumac is a recent addition to the federal list of endangered species.

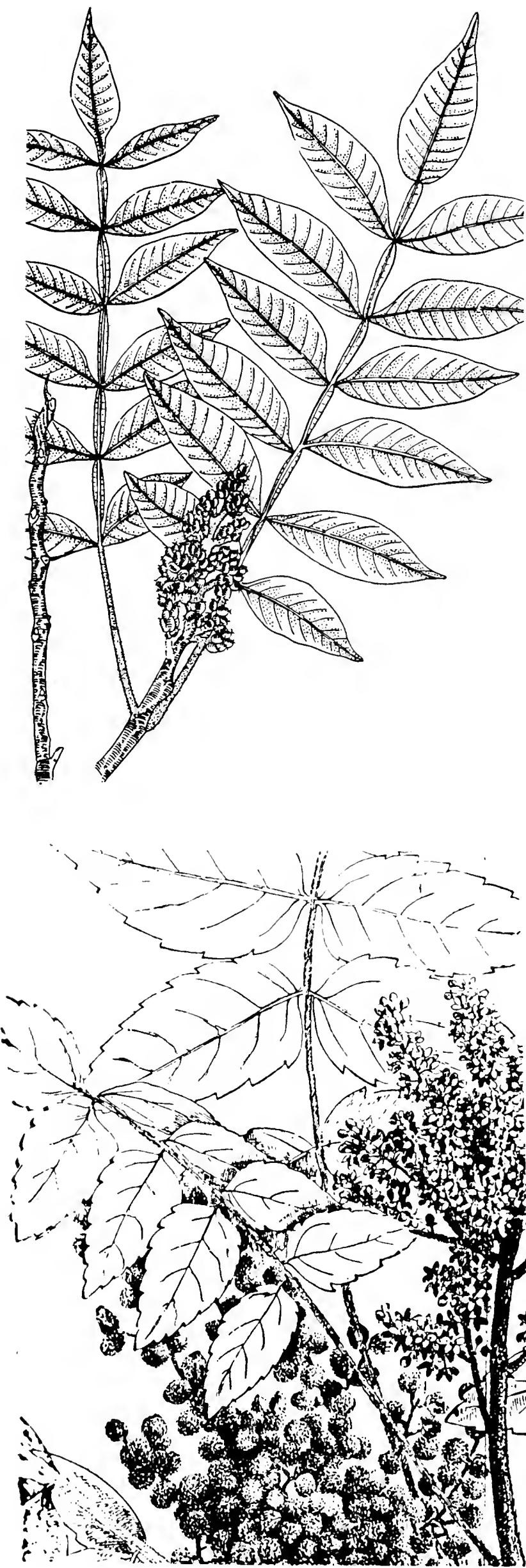
There aren't many examples of plants persisting in cultivation after they've been extirpated in the wild. A classic example is the "lost Gordonia," the Franklin tree, *Franklinia alatamaha*. It has been about 200 years since a reliable sighting of *Franklinia* in the wild in its type location near the Fort Barrington area of McIntosh County, Georgia. Yet several native plant gardens and public gardens have stock from the original Philadelphia plantings of its

discoverers, John and William Bartram, famous early American plantsmen.

Consider, then, that about 30 years ago, Wilbur H. Duncan of Athens saw *Rhus michauxii* near Covington; that there are few reports of later sightings at this location; that recent searches for the plant in the wild at the exact site have been unsuccessful; and that the original stock (genome) from one of the collections of Dr. Duncan, a University of Georgia botany professor, now retired, remains alive in cultivation.

With that scenario, nurseryman Robert McCartney of Woodlander's, Aiken, South Carolina, approached the Nature Conservancy about restoring these "original" plants to their former site. The Conservancy and the City of Covington, on whose land the *Rhus* originally grew, reached a management agreement that assures cooperation in this effort.

Conservancy friends introduced us to the Covington Garden Club, whose members are managing the project locally. Plants were set out in March 1990 in a variety of microhabitats, including a rowed planting in a mowed,



fenced area. Volunteers watered the plants, especially in June to early July during a six-week dry, hot period of record high temperatures and no rain.

What is Michaux's sumac? *Rhus michauxii* was found for the first time by French botanist Andre Michaux, probably in 1789. He listed it as *Rhus pumilum* in his "Flora Boreali-Americana," published posthumously in 1802, and gave its habitat as Mecklenburg County, North Carolina. Michaux had passed that way twice in 1789, noting in his journal on the first occasion "an unknown shrub having no flowers or fructification" and the other "an unknown bush, with opposite leaves." (Michaux's use of the masculine in the specific epithet *pumilum* runs contrary to the presently accepted designation of trees and shrubs as feminine.)

In 1895, Charles Sprague Sargent, arborist of the Arnold Arboretum, changed the name to *R. michauxii* after finding out that *R. pumila*, which freely translates as "dwarf sumac," had been published earlier for another species.

Michaux's sumac — another common name is false poison sumac — has a superficial resemblance to other sumacs, particularly to dwarf versions of winged sumac, *R. copallina*. However, *R. michauxii* stands hardly half a meter (20 inches) tall, it is densely pubescent, and the leaflets are coarsely and evenly serrate (toothed). The leaflets are opposite.

Other sumacs have different combinations of characters and are smooth (without hairs) on leaves or twigs, have leaves without teeth or with unevenly spaced teeth, and stand much taller when mature. Michaux's sumac has many leaflets, whereas poison ivy (*Rhus*

*The rare Michaux's sumac, *Rhus michauxii*, and winged sumac (top), *R. copallina*, are superficially alike, but Michaux's is dwarf size*

radicans) or poison oak (*R. toxicodendron*), which may be similarly dwarf, have merely three leaflets.

Range. Historically, Michaux's sumac was reported from 31 sites in 22 counties in North Carolina, South Carolina, and Georgia. Almost half of these sites no longer support *Rhus michauxii*. Furthermore, only two sites, in North Carolina, have both female and male plants co-occurring.

In Georgia, this sumac is reported from five counties: Cobb, Columbia, Elbert, Muscogee, and Newton (Covington site). The only confirmed extant site is in Elbert County, where six plants (if not the same one) were seen in 1989. Steve Bowling discovered the Columbia County site, but this remains to be relocated.

The Cobb and Muscogee sites are vague, and nearly a century old. The Cobb record will humor Atlantans, for the details of the collector's notes reveal only that plants were scattered "on the edge of a cultivated field near Roswell, [but] in Cobb County, May 28, 1900." A voucher specimen is on file at the Smithsonian Institution. (Thanks to Ken Wurdack, Baltimore, Maryland, for providing this anecdote.)

If anyone wants to check all the old fields in existence at the turn of the century in the Roswell area for the presence of *R. michauxii*, please let us know. Chances are the vegetation now consists mostly of centipede grass and redtips bordered by asphalt.

Habitat. Michaux's sumac appears to prefer open areas. Highway rights-of-way and edges of plowed fields typify most sites known today. The more natural habitats are sandhills and xeric, sometimes rocky ridges with scattered oak, hickory, and pine.

In the absence of some natural or man-made disturbance, the species appears vulnerable to plant succession. The Covington site literally became too shaded. It had been a rocky ridge with a few large trees, perhaps formerly a pasture that gradually had an influx of yellow poplar and loblolly pine, plus Japanese honeysuckle, kudzu, and blackberry thickets.

Future plans. The drought in June to early July 1990 was a setback to the restoration effort in Covington. Nevertheless, a few of the plants have survived due to the watering efforts of the local garden club. If we can re-establish this population (all female plants), we will explore introducing male plants from another population to induce fruit formation. Periodic monitoring is needed to insure that plants are doing well.

It is our hope that new offshoots will be produced — some are evident as we write — and several clumps can be established.

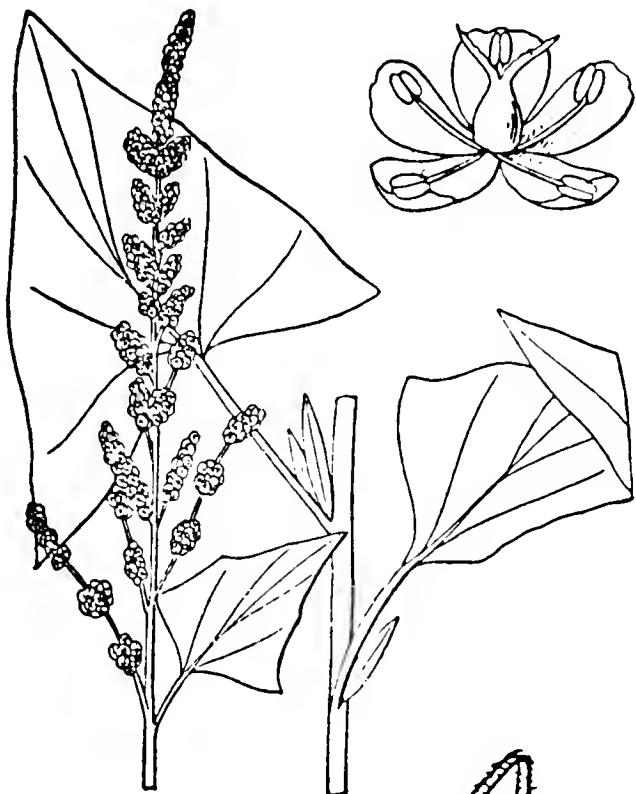
The combination of the lack of active management plus the unisexual nature of individual plants — that is, inability of small populations to form viable fruits — has placed this rare species in jeopardy, truly on the brink of extinction.

Where are the hickories of yesteryear?

After a study of 707 forest stands in 32 states and the District of Columbia, including Georgia, Carl D. Monk, Donald W. Imm, and Robert L. Potter of the Department of Botany and Institute of Ecology at the University of Georgia question whether "oak-hickory" is an accurate forest designation in eastern North America (Castanea, June 1990). While there are many oak-hickory forest stands, they say that there are "far too many oak forests where hickory is absent (17 to 24 percent) or of relative dominance (12 to 15 percent) to justify the oak-hickory designation at a regional level." Their conclusion: "What has been called oak-hickory should be called mixed oak or oak forests."



Venus's pride,
Houstonia caerulea



Good King Henry,
a Chenopodium



Robin's plantain,
Erigeron puchellus

Stinking Willie? Busy Lizzie? Creeping Jenny?

Maybe you know these plants, but do you know whose names they bear?

By Marie Mellinger

“Remember Susan? She had deep black eyes.” “Ah, no, her eyes were softly brown. She lived out in the country, far beyond the town.” “She was a gay and gaudy lass.” “Oh, no, she was a lady. She liked the brightly sunlit ways, never where it was shady.”

Ardent and dedicated botanists tell us that common names are not important. Yet who can help but wonder who Susan was to have a beautiful wildflower, in the genus *Rudbeckia*, named for her? And what about all the other plant names that honor persons known and unknown? We'll tell you here about some, and if anyone can tell us about any of the others, please do so. We know that there are many others, too, but this is a beginning.

Alexander, specifically golden Alexander, a name given to certain wildflowers in the genera *Zizia* and *Thaspium*.

Alice, as in Alice's fern (*Lygodium palmatum*) and Sweet Alice (*Pimpinella*).

Sweet Allison (*Althea*) and white Allison (*Arabis*).

Amy-root. *Apocynum cannabinum*.

Angel—all sorts of Angels. Angel berries (*Lathyrus*), Angel-eyes (*Veronica*), Angel-hair (*Cuscuta*), Angel-tears (*Narcissus*), and Angel trumpet (*Datura meteloides*). As *Lythyrus*, *Narcissus*, and *Datura* are poisonous, perhaps they turn you into an angel. Maybe these all are angels, or only some are Angels.

Annie, as in poor Annie (*Veratum*) and sweet Annie (*Anthemis*, a dog fennel, or *Artemisia*, a wormwood).

Anne. Queen Anne's lace, *Daucus carota*, was named for an English queen who, tradition has it, taught English ladies the Flemish art of lacemaking.

Beth-root, a *Trillium*.

Betty, or Betsy, sometimes bouncing Bet, given to the soapwort, *Saponaria officinalis*. Perhaps she was a laundress or scullery maid.

Creeping Charlie. The ubiquitous ground ivy, *Glecoma hederacea*.

Chester's flower. *Potentilla norvegica*.

Cynthia. *Krigia virginica*, a dwarf dandelion.

Emily's flower. The false dandelion, *Pyrrhopappus*.

Handsome Harry. The meadow beauty, *Rhexia virginica*.

Good King Henry. The goosefoot, *Chenopodium*.

Jack (1) -of-the-buttery, *Sedum acre*, mossy stonecrop; (2) -by-the-hedge, *Alliaria*; (3) -in-the-pulpit, *Arisaema triphyllum*; (4) -in-trousers, *Aquilegia*.

Jacksonbrier. *Smilax smallii*.

Creeping Jenny. Still another name for ground ivy, *Glecoma hederacea*.

Joan Silverpin. A poppy (*Papaver*).

Jim Hill. The hedge mustard, *Sisymbrium officinale*.

Joe Pye. This one we know. It is a

Eupatorium named for an Abnaki medicine man who peddled medicines for agues and fevers.

John the Conqueror. Two species share this name, *Trillium erectum* and *Polygonatum*, Solomon's seal.

Busy Lizzie, *Impatiens capensis*. Busy curing poison ivy?

Mithridate's mustard, the peppergrass, *Lepidium*. In ancient pharmacy, mithridate was a concoction thought to contain an antidote to all poisons. It was named for Mithridates VI, ruler in 120-63 B.C. of Pontus, a kingdom in Asia Minor by the Black Sea, who was reputed to have taken the treatment and lived to be 69.

Osceola's plume. Named for a brave Seminole chief.

Osmond the Waterman. The royal fern, *Osmunda regalis*, which is said to have once saved a Scottish king named Osmund by hiding him from his enemies.

Peter's staff. The mullein, *Verbascum thapsus*.

Robin's plantain, the lovely *Erigeron puchellus*.

Schulz. The weedy mustard plant, *Descurainia brachycarpa*. Otto Eugene Schulz (1874-1936) is the latest author of the species.

Solomon's seal. *Polygonatum*.

Sophia. *Descurainia sophia*, a tansy mustard, formerly named *Sophia sophia*.

Steve's acre. *Delphinium*.

Venus, as in Venus's looking-glass (*Specularia*) and Venus's pride (*Houstonia caerulea*).

Nimble Will. Either *Polygonum cilinoides* or the weedy grass *Muhlenbergia schreberi*.

Sweet William. This is *Dianthus barbatus*.

The stinking Willy, *Trillium erectum*.

We know we have only scratched the surface. Please send the author your corrections, explanations, or additions. The address is: Route 1, Tiger, Georgia 30576.

The atavist at large: Philip Greear in retirement

*Georgia's premier activist ecologist finds
he's freer than ever to fight for this old world*

By Margaret Shannon
Illustrated by Bill Close

Philip Greear possibly is the only environmental activist in Georgia, or anywhere else, to be inspired by a wild pig hunter to prevent destruction of a wilderness area. He also has moved an interstate highway and has parlayed an introduction to the owner of a barrier island into a laboratory as big as all outdoors for his ecology students at Shorter College in Rome. Coming up next is a state-sponsored educational program to offer middle schoolers an on-site cram course in coastal ecology on the same island, Ossabaw, which is near Savannah.

This God's gift to natural causes is a 72-year-old retired professor with enough charisma to attract what one reluctant admirer reluctantly describes as groupies. When Greear gets on a verbal roll, as he often does, his speech takes on the flavor of the north Georgia mountains where he was raised. Matters of environmental import come out a melange of ecospeak and pithy phrases worthy of Garrison Keillor's Lake Wobegon best.

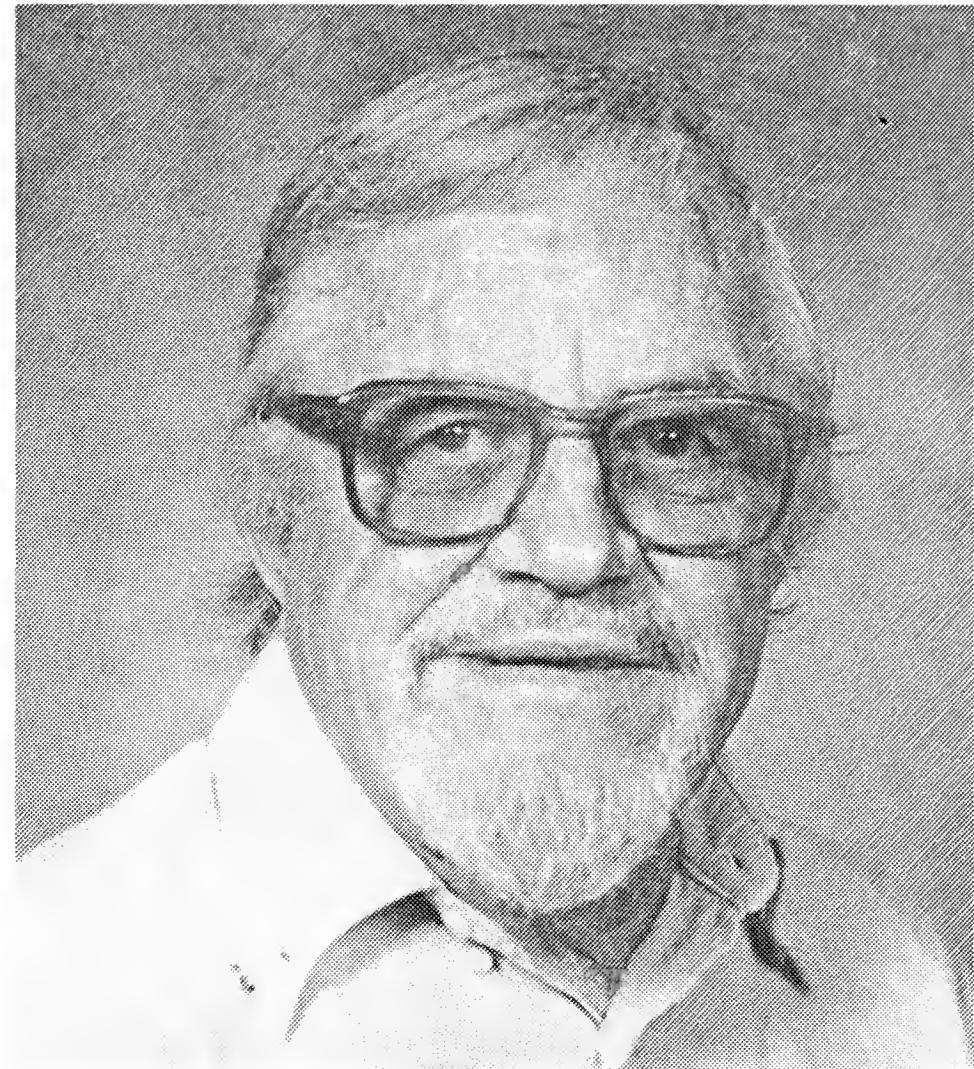
So how does a man get to be a legend

in his own lifetime? After twelve years and two wars (World War II and Korea) in the Air Force, he sets out to become a food scientist and veers into the orbit of two University of Georgia legends (also still living), ecologist Eugene Odum and botanist Wilbur Duncan. When he gets his Ph.D. in botany in 1967, the environmental movement is in ascendancy. There is a happy conjunction of Greear's career and current events.

Greear was among Georgia's earlier ecological activists operating in the real world—on the front lines, so to speak, where the battles are fought in legislatures and bureaucracies and the political trenches. One of his first forays occurred when he and Gene Odum spent a full day at the Georgia General Assembly testifying and speaking and lobbying for the 1960s marshlands protection act, state government's seminal environment effort. Greear and others found out that he was good at that sort of thing.

In the late 1960s and early 1970s, Greear was thrust into the public spotlight by controversy over the route planned for Interstate Highway 75 in the Lake Allatoona area. The state highway department (now the Depart-

During his long academic career, Phil Greear formed and passed on his holistic view of the natural sciences



ment of Transportation) was then even more the bulldozing bully than now, if that seems possible. Nevertheless, when Greear saw the proposed route as requiring an excess of bridges and massive disturbance to the environment, he took on the highway department and won. I-75 was shifted somewhat westward.

Greear rates it as his biggest battle. "That was almost me alone," he says.

Even in his own view, however, it wasn't the most important battle he ever fought. He reserves that for the Cohutta Wilderness, and while some veterans of the environmental wars might dispute that Greear stood almost alone in the I-75 campaign, there is no doubt that there were numerous organizations and individuals fighting alongside the professor in the battle of the wilderness.

And don't forget the pig hunter. Greear says that during the I-75 controversy, he had asked a Cartersville friend, Henry Howell, a surgeon, for help in arranging assurances that the state could purchase strip-mining property at a low price. "He said, 'I'll help you if you'll help me save the Cohuttas,'" Greear relates. "Harvey is a wild pig hunter and he just loved those Cohutta Mountains."

"I wrote a letter to the then chief of the Forest Service in Georgia proposing that the Cohuttas be made a wilderness," Greear continues. "He wrote back saying, 'I'm sorry, but the Cohuttas do not fit the criteria of the wilderness law because there are signs of human activity there.' The wilderness bill had been passed in 1965 and this was about 1972.

"I wrote back I think one of the classic letters of my time. I said, 'If the Cohuttas don't fit the wilderness law, then we will change the law.' And we did." Thirty-four thousand acres of the Cohutta Mountains, primarily in upper Fannin County, Georgia, are now a federally designated and protected wilderness area.

Phil Greear is not modest, and he has a lot not to be modest about. He is an ecologist with few peers in Georgia, a splendid earth scientist, comfortable with speaking in the tongues of either poetry or plain talk. His fans and the occasional nonbeliever agree, however, that his accomplishments, large and small, are due to personality as much as or more than scholarship.

One of his most effective techniques is to seize the moment, as he did when



*Guru
Greear?*

he met the then co-owner of Ossabaw at a conference in 1968. The next year, twenty-five Shorter students spent their spring break camping and studying on Ossabaw, which offered them a largely wild and unspoiled laboratory for coastal biology and ecology. The trip has taken place annually ever since.

Greear probably would have been successful in politics. His charisma is manifest. Through the years, his magnetic personality worked on numbers of Shorter students to the point where he is, by one estimate, a sort of environmental guru to them. Other admirers are drawn by his ideas, his plain-spokenness, his dedication, his baggy-professor image (unstyled haircut and beard, rumpled attire), or all of the above. He got, and still gets, a good press. A friend once introduced him as "a spiritual, intellectual atavist." He liked that.

This mountain son has his own ex-

planation of his reputation and success as an environmental activist. "I think it's probably simply because I have the gift of gab," Greear says. "I can translate to laymen's terms real technical things well, and I think my ability to do that has served me real well."

He gives an example. In May 1990, he went to Seattle to receive the Silver Seal Award of the Garden Clubs of America. A fellow recipient, Lady Bird Johnson, was unable to attend and he was asked to fill her time as well as his own. "I got up and did my usual ecological speech with some qualifications for the situation," Greear recounts. "I got a standing ovation. I was saying things that should frighten those garden club people out of their clothes—to tell the truth about how late we're trying to deal with ecological problems—and yet they just thought it was wonderful."

Greear's message is not of good cheer. He says: "Unless we turn resource use and population size around in this decade before the year 2000, it will be too late to turn it around." He says: "We are in danger of becoming a world without natural process and I don't know whether we can survive that way or not."

This article covers only a fraction of Greear's ideas about this old world and his endeavors through the years to learn and teach and warn about it. He retired in 1986 from Shorter, where he had taught for twenty-five years. His legacy there, says one faculty member, is Shorter's holistic approach to the sciences. Another legacy is that possibly a third of Greear's former students are engaged in serious environmental pursuits, professionally or otherwise.

Outside academe, Greear stories of a less than reverential quality abound. There is, for instance, the one about an eventful field trip on which, among other adventures, Greear hurt his back while trying to rescue a woodchuck. Or the one about the time he led a group of ladies in high heels slogging through salt

marsh. There are plenty of others. Oh, people say with a smile, he's a caution—a character—something else.

Not much so far about botany? Well, it is there. It begins when he was a boy growing up at Helen, Georgia, setting out to identify three plants for his mother. He remembers that two of them were the cardinal flower and the strawberry bush or hearts-a-bustin', *Lobelia cardinalis* and *Euonymus americanus*.

"As much as anything else, my interest in the taxonomy of plants came about by trying to find out the names of the plants for her," Greear says. "That taxonomic interest led wherever I went. I still love to run into a plant I don't know and find out what it is—just can't rest until I find out."

From a Bachelor of Science in agriculture at the University of Georgia, he turned to botany for his doctorate in 1967. His dissertation was on the flora, hydrology, geology, and fossil content of a group of sag ponds in Bartow County. (See "Surprise on Cassville Mountain," *Tipularia*, November 1986.) Today he considers himself a wetlands ecologist.

A slowdown after retirement did not last. There is the new Ossabaw project; he and his wife, Mildred, a retired middle school teacher, have worked on it together. He is busy with Nature Conservancy matters. He and Mrs. Greear often visit with or house-sit for Decatur lawyer James A. Mackay, former legislator and congressman and a

founder of the Georgia Conservancy, who has retired to Rising Fawn and a home on the brink of Lookout Mountain. The Greears have five children and ten grandchildren.

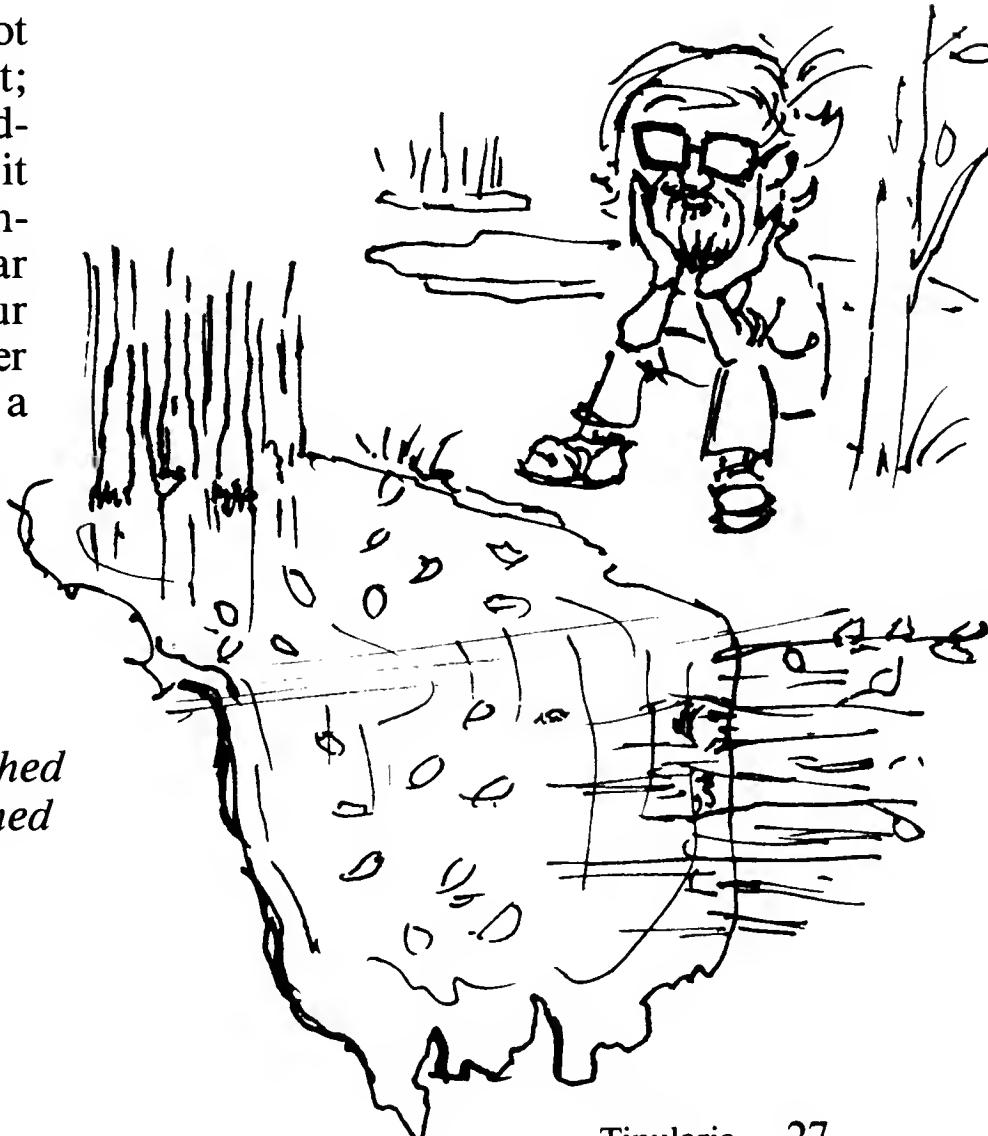
Greear frequently is invited to make speeches; a recurrent theme of his on such occasions is the importance of biological diversity, particularly plant diversity. He was asked to help form a Coosa River basin water resources group, and now chairs it. "We meet once a quarter and worry about water supplies for industries, municipalities, everything," he explains.

This year, a political squabble arose over a development plan that would require filling in part of a flood-plain area in downtown Rome. Greear was right there, squabbling with the best of them.

"I think it's immoral," he said. "I don't have to worry about Shorter College or anybody else. I can say it's immoral to build in the flood plain and if necessary we'll get an injunction to stop it. I couldn't do that as a professor at Shorter, you see. So, yes, I'm free."

Fair warning.

A study of sag ponds launched Phil Greear on a distinguished career as an ecologist and environmental activist



FIRST PERSON SINGULAR

By David L. Emory

Although I had found three plants of the crested wood fern, *Dryopteris cristata*, a new species for Georgia, on my own property on Rico Road near Palmetto in southwestern Fulton County in 1984, for some reason I had never explored a large wooded tract across the road until this past spring. Perhaps it was the "No Trespassing" sign.

Despite the sign, on March 12, 1990, I proceeded into the woods and presently went over a rise and looked down into what I've come to call the Valley of the Elephants. While some of the granite outcrops in southwest Fulton are fairly level and can be called flatrocks, many times granite appears as huge, rounded boulders. In this valley of hardwoods, there are several such large, gray, round masses, looking from above, with some imagination, rather like pachyderms.

In the valley, soon after crossing the stream which serves as the outlet for Rico Lake, I found four scattered fern plants showing only the brown, dead fronds of last year. I could tell they were wood ferns, *Dryopteris*, but obviously not the evergreen marginal wood fern, *D. marginalis*, a familiar sight in the north Georgia mountains. Nor was it the crested wood fern, which is tall, but extremely narrow.

I paid a return visit to the site on April 13, finding two more plants some distance from the first four. New green fronds were up, some at least a foot and a half tall and some already fertile

(showing sori where the spores are produced). At this point I decided the plant was probably the log fern, *Dryopteris celsa*.

The log fern is quite rare in Georgia and is shown in Lloyd Snyder's book, "Field Guide to the Ferns and Other Pteridophytes of Georgia," as growing only in the two most northwestern counties of the state, Dade and Walker.

On May 20, I collected one large frond, pressing it and drying it as a specimen that will eventually go to the herbarium at the University of Georgia. I also wanted to compare it with the log fern Steve Bowling was going to show the Georgia Botanical Society on May 26 at a newly explored site in Murray County.

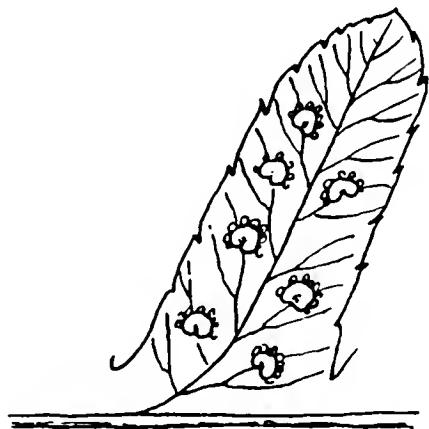
While my fern specimen was not as robust as the plants Steve had found, he and others agreed that mine was indeed the log fern. Steve describes log fern as "a stretched-out Goldie's fern," *Dryopteris goldiana*, which is not only accurate, but also reasonable.

The log fern has been found in four additional counties since the publication of Lloyd's book in 1986, bringing the total to six. The six are:

Columbia County. In May 1989, Jim Allison found a small population in a swampy area above the banks of the Savannah River northwest of Augusta.

Dade County. This population is thought to have been extirpated soon after its discovery in the 1930s.

Fulton County. This is the site reported in this article.



Macon County. A single plant of log fern was discovered on a north-facing slope above the Flint River near Montezuma on a Bot Soc field trip on April 8, 1989.

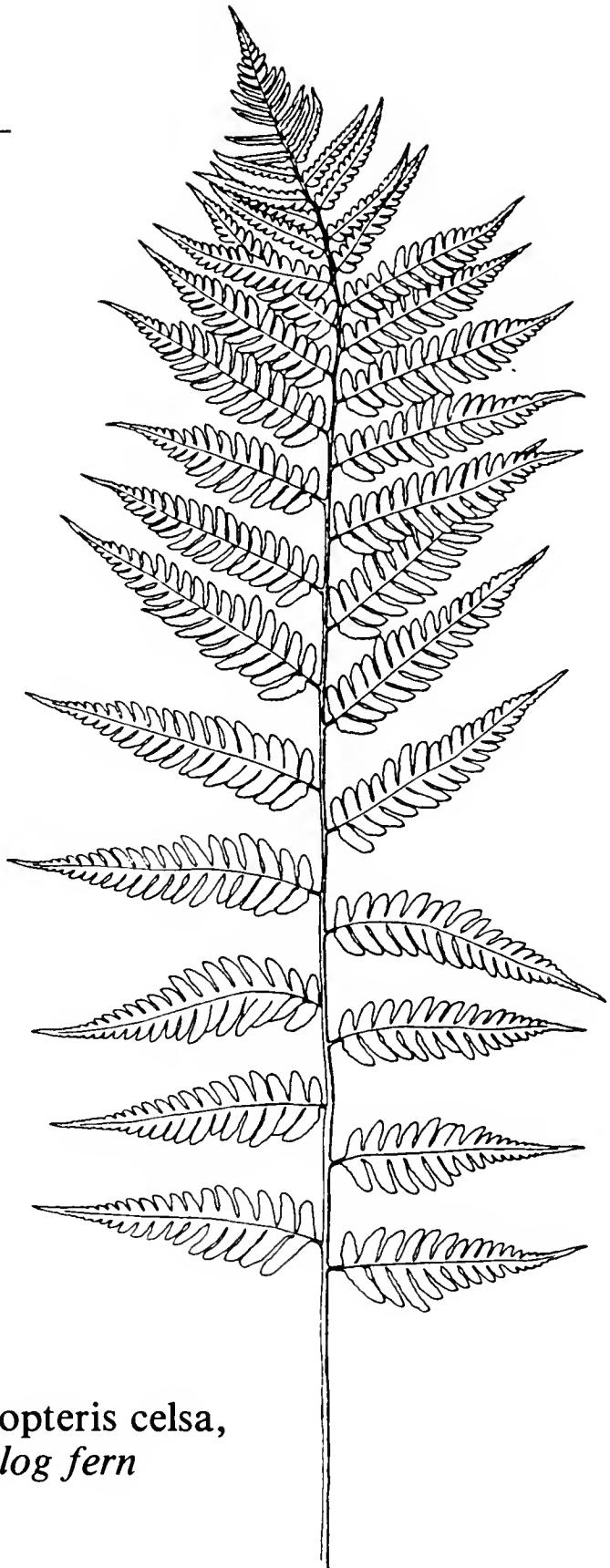
Murray County. Steve Bowling discovered a number of healthy log ferns east of Cisco in the Alaculsy Valley near the Cohutta Wilderness.

Walker County. A large population is located in the Pocket, which the Botanical Society visited during its 1987 Wildflower Pilgrimage.

It is interesting to note that the two rare wood ferns found on opposite sides of Rico Road in south Fulton County are both tetraploids — that is, they arose as hybrids between older fern species and were originally sterile, the way a mule, the cross between a horse and a donkey, is sterile. At some point, however, the chromosome number of at least one hybrid fern doubled, becoming tetraploid, thus allowing the new species to be fertile. These new species were then able to spread.

As hybrids originally, one of the parents is the same for both species. It has been demonstrated that the log fern is the fertile (tetraploid) hybrid of Goldie's fern, one parent, and Florida wood fern, *Dryopteris ludoviciana*, the other parent. The ranges of these two parent wood ferns do not overlap today, but undoubtedly they did live together somewhere sometime — and hybridized.

The crested wood fern is even more interesting, since it is thought to be the



Dryopteris celsa,
the log fern

fertile hybrid of, again, Florida wood fern and *Dryopteris "semicristata"*, a hypothetical parent that has not yet been discovered in nature. *D. "semicristata"* is thought to have been a parent also of *D. carthusiana*, which has not been found in Georgia. *D. "semicristata"* may now be extinct, or perhaps it still exists somewhere and has not been recognized.

The significance of all this to Bot Soc members and other readers is that all areas should be explored botanically, because something may be lurking there, just waiting to be discovered. Who knows where *Dryopteris "semicristata"* may someday be found?

THE BOTANY FILE

Edited by Harriett L. Whipple

Clifford Wetmore, professor of botany and curator of cryptogams at the University of Minnesota, is working on the report on his study of lichens in Georgia's Okefenokee Swamp. In field work from mid-November to mid-December 1989, Wetmore made 1,800 collections of lichens at 37 sites in the swamp.

The U.S. Fish and Wildlife Service commissioned the study to obtain baseline information for gauging possible environmental damage to the Okefenokee from such activities as lumbering and paper manufacturing.

Wetmore is looking for the effects of airborne sulphur dioxide — which, as he points out, is not the same thing as acid rain. Lichens are good indicators because they are easily killed by a low level of sulphur dioxide. His preliminary verdict: "I don't think it presents a problem there."

Scott Lacey, a North Georgia College student, discovered a population of *Isotria medeoloides*, the small whorled pogonia, on July 8 while participating in a Forest Watch species reconnaissance organized by Dennis Stancil in the Chestatee Ranger District of the Chattahoochee National Forest. The population is thought to be the largest in the Southeast.

Jim Allison is under contract for two Georgia Department of Natural Resources (DNR) projects:

1. A recovery plan for three federally protected granite outcrop plants — *Isoetes melanospora*, the black-spored quillwort; *I. tegetiformans*, the mat-forming quillwort; and *Amphianthus pusillus*, the pool sprite.

2. A population survey of two plants in southwest Georgia — *Lythrum curtissi*, Curtiss loosestrife, and *Cacalia diversifolia*, the variable-leaf Indian plantain.

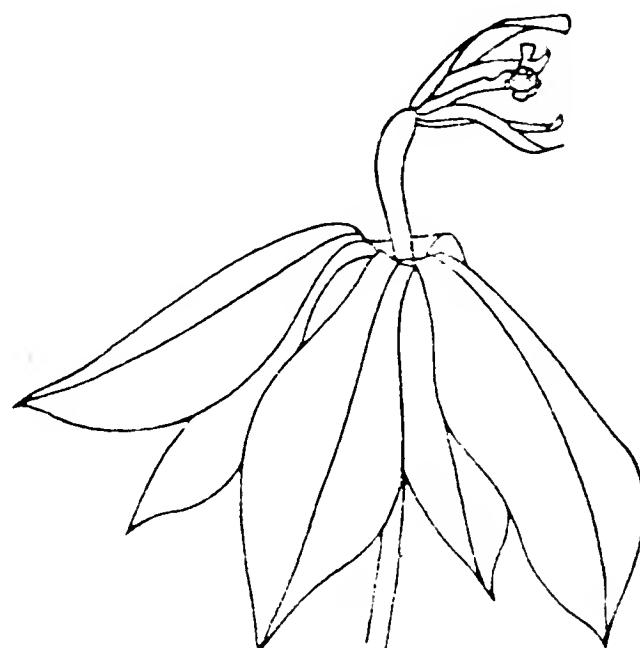
David Emory and Scott Ranger are relocating populations of the orchid *Platanthera integrilabia*, old monkeyface, as part of a DNR-sponsored project.

Diane Davies, state coordinator for environmental education programs of the University of Georgia Extension Service, administers the largest residential environmental education program in the United States. The program emphasizes using the outdoors as a dynamic living laboratory for the interdisciplinary study of academic subjects.

The program serves more than 500 schools from six states in the Southeast. There are four centers in Georgia: Wahsegia (Dahlonega), Tybee, Jekyll, and Rock Eagle (Eatonton).

Mike Wharton, director of Sandy Creek Nature Center near Athens, reports a plan for a four-mile Greenway Trail to connect the Center (225 acres) and Sandy Creek Park (640 acres with a 240-acre lake). It will be an interpretive

*Isotria medeoloides,
small whorled pogonia*



trail for wetland ecology and includes beaver swamps, marsh areas, typical Piedmont flood plain, and an oxbow lake.

Georgia College, Milledgeville, has received 20 acres of hardwoods given by Ben Gautier. This area, Gautier Nature Preserve, will be used for botanical research and interpretive studies.

Thompson Mills Forest and Arboretum, in western Jackson County near Braselton, is "one of the best-kept secrets" of the University of Georgia, according to Claud L. Brown, Alumni Foundation professor emeritus of forest resources.

The 318-acre facility's diversity of natural sites includes flood plains and swamps along the Mulberry River, three upland soil types, and an extensive granitic outcrop.

It contains more than 100 species endemic to the area and more than 80 from other parts of the state — altogether about 85 percent of all trees native to Georgia — plus more than 130 taxa of exotic conifers from countries around the world.

Thompson Mills is open to individuals and groups by appointment. To schedule a guided tour, contact William Lott, forest manager, at 404-654-2666.

Anne Shank of the State Botanical Garden of Georgia, Athens, is project

director for Garden of Wonder, a program emphasizing using the outdoors, especially schoolgrounds, as a classroom. Garden Clubs of Georgia members have been helping to identify good areas for outdoor classrooms throughout the state.

Henning von Schmeling of the Chattahoochee Nature Center, near Roswell, has successfully grown 19 endangered species and propagated 12 of these.

Charles Wharton is inventorying vegetation of the 1,200-acre Chicopee Woods Nature Preserve, five miles south of Gainesville.

Lockery Arboretum in Milledgeville is adding native woody plants and wildflowers and expanding its bog and aquatic areas, according to Ruth Patterson, technical and educational coordinator.

Connie Gray, School of Environmental Design, University of Georgia, is designing a fern glade area of native ferns for the Atlanta Botanical Garden.

Terry May, supervisor of grounds, reports that one of the other construction projects underway is a moon garden. It's done with white and gray plants.

Panola Nature Center, south of Decatur, has added more classroom and office space.

SITE-SEEING

By Linda Renshaw

On maps, the Georgia-South Carolina line divides the Savannah National Wildlife Refuge in two; in nature, it is one: nearly 26,000 acres of tidal fresh-water marsh, a critical wintering place for migratory waterfowl, home to an abundant variety of wetland plants and wildlife.

Laurel Hill Wildlife Drive, within the refuge, offers a good overview of the managed impoundment system that has replaced the rice fields of a century ago. It is marked by a sign at the refuge entrance, which is located on U.S. Highway 17 north of Savannah, just over the boundary between the two states. Coming south, the entrance is seven miles from Hardeeville, South Carolina.

The four-mile Wildlife Drive winds over remains of handmade dikes from the rice-planting era, now built up as much as five or six feet. Altogether, almost 40 miles of dikes lace the fresh-water marsh and the hardwood hammocks of the refuge.

The refuge is a singular place because it is totally dependent on fresh water from the Back River and the Little Back River, which form the Savannah River's eastern channel. Oil spills, other water-borne contaminants, and air pollution associated with operation of the port of Savannah threaten the health of the refuge, which acts as an environmental

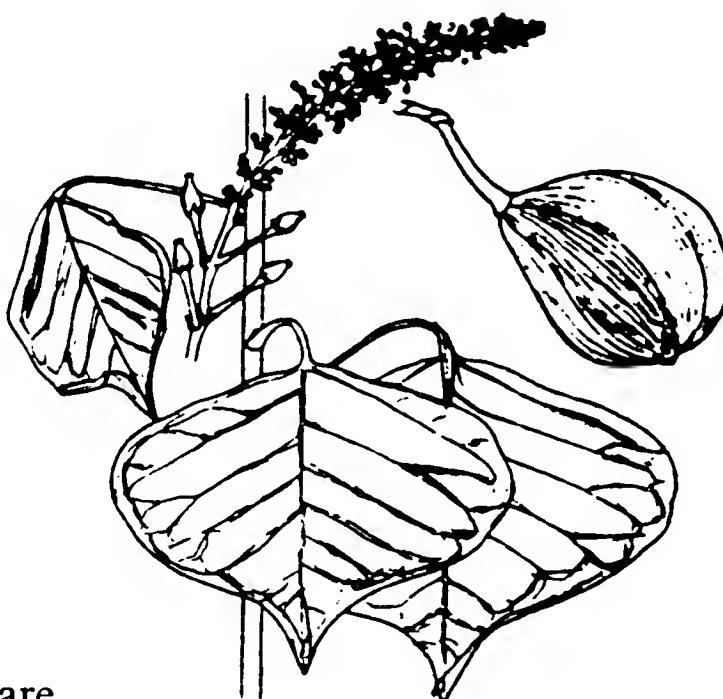
barometer. If its wildlife is in trouble, people are next to be affected.

The management regime varies annually. Sometimes crops are planted; more often, the growth of native moist-soil plants, beneficial to wintering ducks, is encouraged. Nearly 3,000 acres of reclaimed rice fields are home for waterfowl, wading birds, and perhaps more alligators than you've ever seen in one place.

Laurel Hill Drive leads past a VORTAC station, a navigational aid for pilots flying into nearby airfields. Then, on the right, a sign at a pull-off indicates a tiny graveyard. A walkway leads to the weathered tombstone of a slave.

In the rice days, pine and cypress structures called trunks used tidal flow to drain and flood the fields. Modernized trunks are now the mainstay of impoundment management. Past one of these, the road leads to the largest hammock on the drive, and in the marsh to the right, before the road turns into the woods, a stand of wild rice can be found when in bloom.

On the hammock, called Recess Island, a parking area and a sign mark the Cistern Trail. Across the road stand some distinctive trees with slick bark and platter-sized leaves: China parasols, also called Japanese varnish-trees, *Firmiana platanifolia* (von Linne) Marsili. They are native to Taiwan and grow only in this spot on the refuge.



Sapium sebiferum,
Chinese tallow-tree

Among trees along the trail are mulberries, hackberries, and chinaberries. Two more hammocks lie ahead. As the drive departs the second, a small stand of silverbell trees grows on the right, conspicuous when in bloom.

Just before turning sharply to the left, the road passes a stand of crooked, unkempt trees on the left. These are Chinese tallow-trees, *Sapium sebiferum* (Linnaeus) Roxburgh, fast growers that have become a nuisance on the refuge. The heart-shaped leaves resemble an aspen's and turn gold in the winter.

It is said that Benjamin Franklin sent tallow-tree seed from Europe to a Savannah plantation owner for experimentation in candlemaking. Boiled in water, the seeds yield the "tallow" for candles. Coastal residents make wreaths from the tree's white, wax-coated, popcorn-like seed heads. Locals refer to the tallow-tree as the popcorn tree.

Along the last stretch of road before the exit to Highway 17 is prime alligator-spotting terrain. Water-loving plants line the drive: spider lilies, wild iris, and wild hibiscus.

Directly across Highway 17 is another gate. Beyond it the dikes continue along a diversion canal and through northern impoundments. This part of the refuge is closed to the public from November 1 to March 15. The rest of the year it is open, but only to foot or bicycle traffic. Hot weather along this trail means bugs

Firmiana platanifolia,
Japanese tallow-tree
or Chinese parasol-tree



and plenty of them, but in spring and fall the hike is both enjoyable and rewarding.

Laurel Hill Wildlife Drive is open seven days a week from sunrise to sunset. For more information, write Savannah Coastal Refuges, P.O. Box 8487, Savannah, GA 31412, or call 912-944-4415.

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BOOK REPORT

Edited by L. Scott Ranger

Guide to the Vascular Plants of the Blue Ridge. By B. Eugene Wofford. Athens: University of Georgia Press, 1989. 374 pages, 10 plates of line drawings, one map, glossary. \$35 cloth, \$15 paper.

The idea of limiting a guide to a distinct physiographic region instead of to a state or states makes a great deal of sense. Plants do not follow political boundaries, but often align themselves with natural geography. In this new guide, Mr. Wofford presents the Blue Ridge as a single unit for the first time, with comprehensive coverage in 85 counties from Georgia to Virginia. This is perhaps the most floristically diverse region in the eastern half of our continent.

A set of eminently usable keys is provided for the families, genera, and species. Mr. Wofford's many years of teaching at the University of Tennessee have obviously shown him the need for clear, simple writing and for easily split key couplets. If Gray's "Manual" or Britton and Brown prove difficult, Wofford should be sheer enjoyment. It is good to come to the end of a key path feeling confident about identification. This is my experience more often

with Wofford than with Radford's "Manual of the Vascular Flora of the Carolinas." The fact that there are no species descriptions in the Wofford guide isn't necessarily a hindrance to the reader. A good glossary and descriptive plates are provided.

The trend to use specialists continues. Not only did Mr. Wofford use the works of people like Thomas S. Patrick for *Trillium*, but he also provided bibliographic information for many families and genera where we can go for more detailed information. This is a good trend, but has the potential drawback of having every comprehensive guide use the same set of keys for difficult groups. A different set of keys can be helpful for these.

The continuing trend to abandon supposed phylogenetic grouping results in an alphabetical arrangement within the broad groups of pteridophytes, gymnosperms, monocots, and dicots. Wofford accepts most of the new treatments in taxonomy but could still be characterized as being conservative in his approach to new ideas. The index is extremely comprehensive, so synonyms are easily found. Common names are provided in a separate index.—*L. Scott Ranger*

Membership The Georgia Botanical Society is open to all persons interested in the botany of Georgia. Annual dues: individual or family, \$15; group, \$20; student, \$5. Send mailing address and check made payable to the Georgia Botanical Society to: Suzanne S. Jackson, treasurer, 3461 Ashwood Lane, Chamblee, Georgia 30341. Members receive *Tipularia* without extra charge. Persons wishing only to receive the magazine may become *Tipularia* associates for \$7 a year. Single copies (when available), \$4. **Editorial information** *Tipularia* strives to combine the scientific authority of a botanical journal with the readability of a magazine. Some articles are assigned; others are welcome for consideration. *Tipularia* is unable to pay for articles or art, but there is no charge for publication. Send manuscripts and inquiries to: Ginger Kaderabek, editor, 1281 McLendon Drive, Decatur, Georgia 30033.